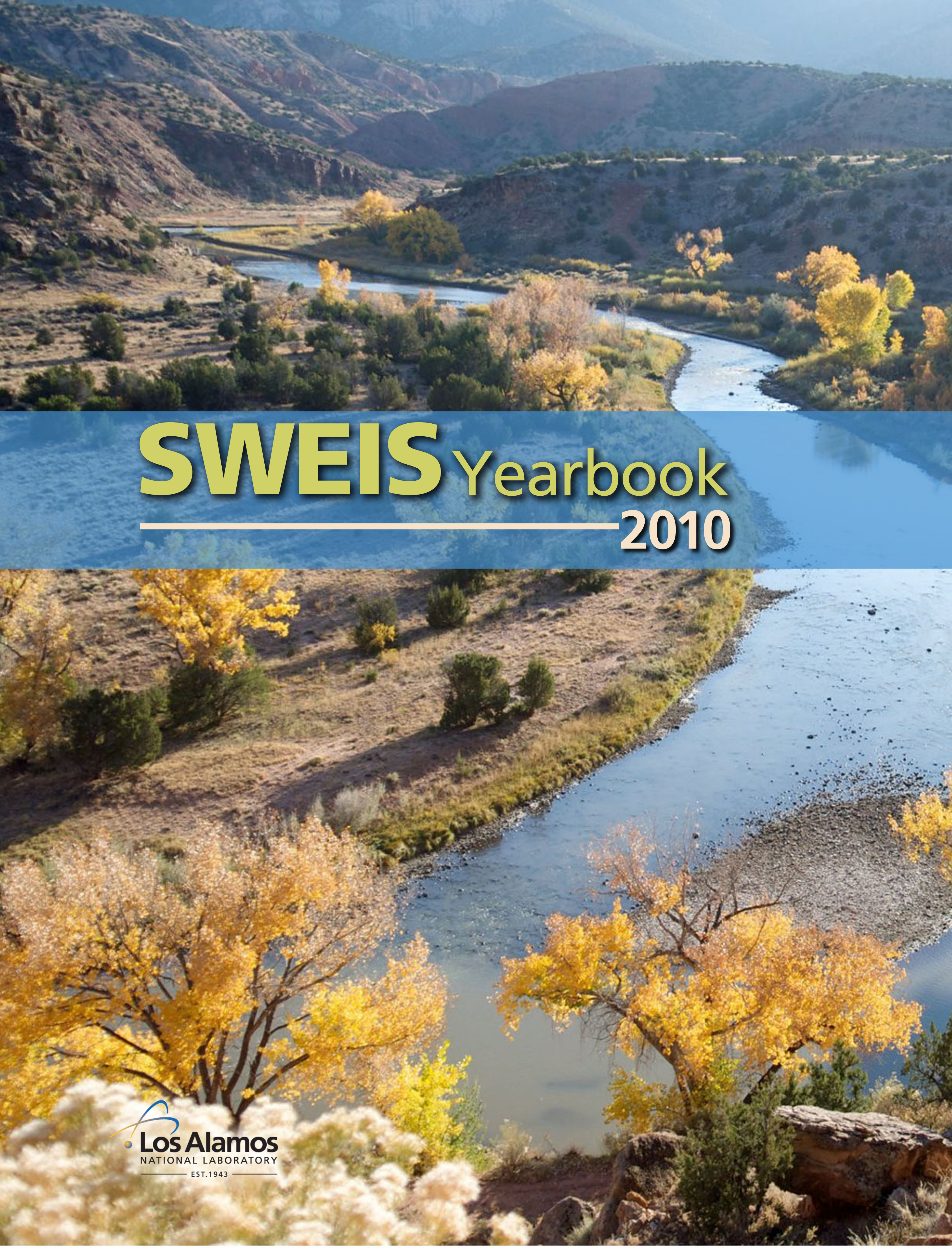
SWEIS Yearbook 2010



Los Alamos
NATIONAL LABORATORY
EST. 1943

Cover photo: The Rio Grande east of the Laboratory.
(Los Alamos National Laboratory)

LA-UR 12-01648 April 2012

Title

SWEIS Yearbook—2010

Comparison of 2010 Data to Projections of the Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory

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Preface

The Site-wide Environmental Impact Statement (SWEIS) was issued in June 2008 (DOE 2008a). In September 2008, DOE/NNSA issued the first ROD for the 2008 SWEIS (DOE 2008b). DOE/NNSA issued the second ROD for the 2008 SWEIS in July 2009 (DOE 2009a).

Five years after issuance of a SWEIS, DOE performs a formal analysis of the adequacy of the SWEIS to characterize the environmental envelope for continuing operations at LANL. The Annual SWEIS Yearbook was designed to assist DOE in this analysis by comparing operational data with projections of the SWEIS for the level of operations selected by the SWEIS. Yearbook publications to date are available online at the Los Alamos National Laboratory Research Library.

The 2010 Yearbook is the third year of data compiled since the first ROD for the LANL SWEIS was issued and the second year of data compiled since the second ROD was issued. The Yearbook is an essential component in DOE's five-year evaluation of the SWEIS.

The SWEIS Yearbooks contain data that can be used for trend analyses to identify potential problem areas and enable decision-makers to determine when and if an updated SWEIS or other National Environmental Policy Act (NEPA) analysis is necessary. This edition of the Yearbook summarizes the data from Calendar Year (CY) 2010.

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Executive Summary

Los Alamos National Laboratory (LANL or the Laboratory) Calendar Year (CY) 2010 operations data mostly fell within the 2008 Site-Wide Environmental Impact Statement (SWEIS) projections. Although operation levels for six LANL facilities exceeded the SWEIS operation projections, five of the six facilities did not exceed projections of air emissions, outfall discharge, waste, or other impact parameters; therefore, there is no potential for significant impact to the environment from operations of the Laboratory. The Radioactive Liquid Waste Treatment Facility (RLWTF) exceeded SWEIS operation levels and exceeded the SWEIS projection for annual low-level radioactive waste (LLW) generation; however, this exceedance was due to the disposal of a 5-year backlog of waste. In addition, waste quantities that exceeded the SWEIS levels were one-time, non-routine events that do not reflect the day-to-day operations of the Laboratory. No other impact parameters were exceeded.

1.0 Background

In 1999, the US Department of Energy (DOE) published a SWEIS for the continued operation of LANL. DOE issued a Record of Decision (ROD) for this document in September 1999.

In 1999, DOE and LANL implemented a program, the Annual Yearbook, making comparisons between SWEIS projections and actual operations data. The Yearbooks provide DOE/National Nuclear Security Administration (NNSA) with a tool to assist in determining the continued adequacy of the SWEIS in characterizing existing operations. The Yearbooks focus on operations during one CY and specifically address the following:

- Facility and/or process modifications or additions.
- Types and levels of operations.
- Environmental effects of operations.
- Site-wide effects of operations.

In August 2005, a memo was issued to LANL from DOE/NNSA to prepare a new SWEIS (NNSA 2005). The new SWEIS was issued in June 2008 (DOE 2008a).

The 1999 and 2008 SWEISs analyzed the potential environmental impacts of future operations at LANL. In 1999, DOE announced in its ROD that it would operate LANL at an expanded level and that the environmental consequences of that level of operations were acceptable.

In September 2008, DOE/NNSA issued the first ROD for the 2008 SWEIS (DOE 2008b). DOE/NNSA chose to implement the No Action Alternative with the addition of some elements of the Expanded Operations Alternative in the September ROD. In July 2009, DOE/NNSA issued the second ROD for the 2008 SWEIS (DOE 2009a); again

DOE/NNSA chose to implement the No Action Alternative with some additional elements of the Expanded Operations Alternative.

2.0 Current Results

The 2010 Yearbook represents the fourth full year of operations data reported since LANL transitioned from the University of California (UC) to Los Alamos National Security, LLC (LANS). LANS consists of UC, Bechtel, BWX Technologies, and Washington Group International, and currently operates LANL for DOE/NNSA. In addition to the change in management, a major reorganization occurred during CY 2006, resulting in the formation, renaming, and/or dissolution of various LANL groups, divisions, and directorates.

This Yearbook represents data collected for CY 2010. The selected levels of operation from the RODs and the SWEIS provided projections for these operations. This Yearbook compares data from CY 2010 to the 2008 SWEIS projections where appropriate.

The 2010 Yearbook addresses capabilities and operations using the concept of "Key Facility" as presented in the SWEIS. The definition of each Key Facility hinges upon operations (research, production, services, and environmental impacts) and capabilities and is not necessarily confined to a single structure, building, or technical area (TA). Chapter 2 discusses each of the 15 Key Facilities from three aspects—significant facility construction and modifications that have occurred during 2010, the types and levels of operations that occurred during 2010, and the 2010 environmental effects of operations. Chapter 2 also discusses the "Non-Key Facilities," which include all buildings and structures not part of a Key Facility, or the balance of LANL.

In 2008, Pajarito Site (TA-18) was placed into Surveillance and Maintenance mode. Operations have ceased and the facility was downgraded to a Less-than-Hazard-Category-3 Nuclear Facility. For the purpose of the 2008, 2009, and 2010 SWEIS Yearbooks, Pajarito Site and its nine capabilities have been removed as a Key Facility. In addition, the 2008 SWEIS recognized the Nicholas C. Metropolis Center (formerly known as the Strategic Computing Complex) as a new Key Facility because of the amounts of electricity and water it may consume.

3.0 Operation Levels

The 2008 SWEIS No Action Alternative and approved elements of the Expanded Operations Alternative projected a total of 15 facility construction and modification projects within the Key Facilities. During 2010, seven construction/modification projects were undertaken. Electrical and mechanical systems were expanded to meet new computer requirements at the Nicholas C. Metropolis Center; construction of the Radiological Laboratory/Utility/Office Building continued at TA-55; Nuclear Materials Safeguards and Security Upgrades Project continued at TA-55; the Ion Exchange

Building (TA-03-2519) was brought online at Sigma Complex; a major upgrade to the heating ventilation system was started at Radiochemistry Facility (TA-48-0001); the Waste Management and Risk Mitigation Facility (WMRM; TA-50-0250) at the Radioactive Liquid Waste Treatment Facility was placed into service; and demolitions of Tritium Science and Fabrication Facility (TSFF; TA-21-0209) and Tritium Systems Test Assembly (TSTA; TA-21-0155) within the Tritium Facilities were completed. Within the Non-Key Facilities, two major construction projects were undertaken: The Pro Force Running Track was completed in 2010, and construction of the Tactical Training Facility at TA-16 was started in 2010.

During CY 2010, 82 capabilities were active and nine capabilities were inactive at LANL's Key and Non-Key Facilities. At the Chemistry and Metallurgy Research Key Facility (CMR), Destructive and Nondestructive Analysis Project, Nonproliferation Training, and Large Vessel capabilities were not active. No High-Pressure Gas Fills and Processing, Diffusion and Membrane Purification, Hydrogen Isotopic Separation, or Radioactive Liquid Waste Treatment took place at the Tritium Facilities. Materials Test Station equipment was not installed at the Los Alamos Neutron Science Center (LANSCE). No Waste Retrieval at Solid Radioactive and Chemical Waste Facilities took place.

During 2010, five LANL facilities operated at levels approximating those projected in the SWEIS or beyond what was projected in the SWEIS—Bioscience, LANSCE, the Materials Science Laboratory (MSL), RLWTF, and the Non-Key Facilities. Bioscience and the MSL Key Facilities are more akin to the Non-Key Facilities and represent the dynamic nature of research and development at LANL; none of these facilities are major contributors to the parameters that lead to significant potential environmental impacts.

Radiochemistry Facilities exceeded operation level projections in the SWEIS; however, radioactive air emissions, outfall discharge, waste quantities, and were below projections in the SWEIS.

LANSCE exceeded operation level projections in the SWEIS for the capability of treatment of radioactive liquid waste. Contributions of radioactive liquid waste received from RLWTF and radioactive liquid waste from the TA-21 remediation work nearly doubled the amount projected in the SWEIS.

RLWTF exceeded operation level projections in the SWEIS for the amount of evaporator bottoms shipped off site for a commercial facility. A cleanout campaign to treat and dispose of evaporator bottoms (residual actinides and impurities resulting from contaminated effluents filtered through an evaporator) was conducted in 2010. Disposal of the evaporator bottoms exceeded SWEIS projections for low-level radioactive waste (LLW) generation at RLWTF due to the five-year backlog of evaporator bottoms.

4.0 Environmental Effects of Operations

This Yearbook evaluates the effects of LANL operations in three general areas—effluents to the environment, workforce and regional consequences, and changes to environmental areas for which DOE/NNSA has stewardship responsibility as the administrator of LANL.

Radioactive emissions have decreased significantly since 2007, after an emission control system at LANSCE was repaired. Radioactive airborne emissions from point sources (i.e., stacks) during 2010 totaled approximately 298 curies less than one percent of the 10-year average of 34,000[1] curies projected in the SWEIS.

During 2010, emissions from criteria pollutants were well below both 2008 SWEIS projections and the New Mexico Administrative Code, Title 20, Chapter 2, Part 73.

Los Alamos National Security (LANS) reported its greenhouse gas emissions from stationary combustion sources to the US Environmental Protection Agency (EPA) for the first time in CY 2010 in response to new federal regulations. In CY 2010, these stationary combustion sources emitted 60,354 metric tons of carbon dioxide equivalents.

Since 1999, the total number of permitted outfalls was reduced from 55 identified in the 1999 SWEIS to 15 that were renewed in the August 2007 National Pollutant Discharge Elimination System (NPDES) permit No. NM0028355. As a result of these closures, there has been a significant decrease in flow. In 2010, 12 outfalls flowed. Calculated NPDES discharges totaled 141.8 million gallons for CY 2010 compared with a projected volume of 279.5 million gallons per year. This is approximately 8.5 million gallons more than the CY 2009 total of 133.3 million gallons. The 2010 total volume of discharge is well below the maximum flow of 279 million gallons that was projected in the SWEIS.

Water levels in wells penetrating into the regional aquifer continue to decline in response to pumping, typically by several feet each year. In areas where pumping has been reduced, water levels show some recovery. In 2010, LANL installed two monitoring wells in the perched intermediate groundwater zone and 12 monitoring wells in the regional aquifer.

Wastes have been generated at levels below quantities projected in the SWEIS. The 2008 SWEIS combines transuranic (TRU) and mixed TRU into one waste category since they are both managed for disposal at the Waste Isolation Pilot Plant. In 2010, waste quantities from LANL operations were below SWEIS projections for all waste types,

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1 The projected radiological air emissions changed from the 10-year annual average of 21,700 curies in the 1999 SWEIS to 34,000 curies in the 2008 SWEIS. Annual radiological air emissions from 1999–2005 were used to project air emissions in the 2008 SWEIS. Emissions of activation products from LANSCE were much higher in those years due to a failure in one component of the emissions control system. The repair of the system in CY 2006 has significantly decreased emissions.

reflecting the levels of operations at both the Key and Non-Key Facilities. Waste quantities at Key and Non-Key Facilities that exceeded the SWEIS levels were one-time, non-routine events.

In CY 2010, DOE/NNSA demolished 27 buildings and 28 trailers/transportables. In addition, 11 trailers were sold publicly by salvage, eliminating a total of 268,902 square feet of the Laboratory's footprint.

In the 2008 SWEIS, actual utility impacts and performance changes were analyzed. Annual electricity and water usage from 1999–2005 remained well below the levels projected in the 1999 SWEIS. In the 2008 No Action Alternative, the total electric consumption and the total water consumption were reduced to a number closer to the average electric and water consumption for the six years analyzed. The electric consumption for CY 2010 was 426 gigawatt-hours. Water consumption for CY 2010 was 413 million gallons. Electric consumption was lower and water consumption was higher than in CY 2009. Gas consumption for CY 2010 was 1.10 million decatherms, slightly more than CY 2009. The Laboratory is committed to increasing energy efficiency and will continue to make improvements towards that goal in the future.

Radiological exposures to LANL workers are well within the levels projected in the SWEIS. The total effective dose equivalent for the LANL workforce was 125.4 person-rem during 2010, and is slightly higher than the 2009 dose of 116.8 person-rem but lower than the workforce dose of 280 person-rem projected in the 2008 SWEIS. In 2010, there were approximately 141 recordable cases of occupation injury and illness; this represents a 19% reduction from CY 2009. Also, approximately 43 cases resulted in days away, restricted or transferred duties per year, representing a 38% reduction in cases from CY 2009.

In the 2008 SWEIS No Action Alternative, the 2005 levels of employment were assumed to remain steady at 13,504. During 2006 and 2007, the size of the workforce slowly began to decrease. The 11,609 employees at the end of CY 2010 represent an increase of 164 employees (1.4%) as compared with the 11,445 total employees reported in the 2009 Yearbook.

Measured parameters for ecological resources and groundwater were similar to SWEIS projections, and measured parameters for cultural resources and land resources were below SWEIS projections. For land use, the SWEIS projected the disturbance of 41 acres of new land at TA-54 because of the need for additional disposal cells for low-level radioactive waste. (The 1999 SWEIS projected that 15 prehistoric sites would be affected by the expansion of Area G into Zones 4 and 6 at TA-54.) As of 2010, this expansion had not become necessary. Since 2001, approximately 2,440 acres of land have been transferred to the Department of Interior to be held in trust for the Pueblo of San

Ildefonso or conveyed to Los Alamos County. Tracts C-1 and A-13 were conveyed to Los Alamos County in 2010.

Ecological resources include biological resources such as protected sensitive species, ecological processes, and biodiversity. The recovery and response to the Cerro Grande Fire of May 2000 has included a wildfire fuels reduction program, burned area rehabilitation and monitoring efforts, and enhanced vegetation and wildlife monitoring. Cultural resources remained protected in CY 2010, and no excavation occurred of sites at TA-54 or anywhere else on LANL. Twenty historic buildings were demolished in fiscal year (FY) 2010. Ecological and cultural resources remain stable in 2010.

In conclusion, LANL operations in CY 2010 have mostly fallen within SWEIS projections. Although operation levels for six LANL facilities exceeded the SWEIS operation projections, five of the six facilities did not exceed projections of air emissions, outfall discharge, waste, or other impact parameters; therefore, there is no potential for significant impact to the environment from operations of the Laboratory. The RLWTF exceeded SWEIS operation levels and exceeded the SWEIS projection for annual LLW generation; however, this exceedance was due to the disposal of a 5-year backlog of waste. In addition, waste quantities that exceeded the SWEIS levels were one-time, non-routine events that do not reflect the day-to-day operations of the Laboratory. No other impact parameters were exceeded. Overall, the operations data from 2010 indicate that LANL has been operating within the 2008 SWEIS projections and regulatory limits.

Acknowledgments

Marjorie Wright, ENV-ES, served as the document manager for the 2010 SWEIS Yearbook, and Hallie Mahowald (ENV-ES) served as chief contributor. Caroline Spaeth provided editorial support.

The authors would like to thank Winters Red Star (BPS-DO) and David Frank (ET-ER) for creating maps and give a special thanks to John Isaacson and Jennifer Payne (SWEIS Program Managers) for their support and assistance.

Many individuals assisted in the collection of information and review of drafts. Data and information came from many personnel at the Laboratory, including facility and operating personnel and those who monitor and track environmental parameters. The Yearbook could not have been completed and verified without their help. Although all individuals cannot be mentioned here, the table below identifies the major contributors from each of the Key Facilities and other operations.

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Cultural Resources	Bruce Masse
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Decontamination, Decommissioning, and Demolition	Duane Parsons
Decontamination, Decommissioning, and Demolition	Ian Albright
Decontamination, Decommissioning, and Demolition	Mona Valencia
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Environmental Management Systems	Debra Hall
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Materials Science Laboratory	Anna Zurek
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Non-Key Facilities–Sanitary Effluent Recycling Facility	Terry J. Singell
Non-Key Facilities–Tactical Training Facility	Jeff Tucker
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Acronyms

ACL	Advanced Computing Laboratory
AIRNET	air monitoring network
ALARA	as low as reasonably achievable
AOC	area of concern
ARRA	American Reinvestment and Recovery Act
ARTIC	Actinide Research and Technology Instruction Center
BGS	below ground surface
BIO	Basis for Interim Operation
BMP	best management practice
BSL	Biosafety Level
BTF	Beryllium Technology Facility
BV	background values
CAS	central alarm station
CCF	Central Computing Facility
CD	Critical Decision
CGP	Construction General Permit
CGTG	Combustion Gas Turbine Generator
CME	Corrective Measure Evaluation
CMI	Corrective Measure Implementation (Plan)
CMR	Chemical and Metallurgy Research (Building)
CMRR	CMR Replacement
CMRR EIS	CMRR Environmental Impact Statement
Consent Order	NMED Compliance Order on Consent
CRMP	Cultural Resources Management Plan
CVD	Containment Vessel Disposition
CY	calendar year
DART	Days Away, Restricted or Transferred (rate)
D&D	decontamination and decommissioning
DD&D	decontamination, decommissioning, and demolition
DARHT	Dual-Axis Radiographic Hydrodynamic Test (facility)
DE-1	High Explosive Science and Technology (group)
DOE	US Department of Energy
DSA	Documented Safety Analysis
DVRS	Decontamination and Volume Reduction System
EISU	Electrical Infrastructure Safety Upgrades
EMS	Environmental Management System
EP	Environmental Programs (Directorate)
EPA	US Environmental Protection Agency
ER	Environmental Restoration (Project)
FONSI	Finding of No Significant Impact
FTE	full-time equivalent
FY	fiscal year
HAP	hazardous air pollutant
HazCat	Hazard Category
HE	high explosives
HEP	High Explosives Processing
HEPA	high-efficiency particulate air (filter)
HET	High Explosives Testing
HEWTF	High Explosive Wastewater Treatment Facility

HPI	Human Performance Improvement
HRL	Health Research Laboratory
HVAC	heating, ventilation, and air conditioning
IP	Individual Permit
IPF	Isotope Production Facility
ISMS	Integrated Safety Management System
ITSR	Interim Technical Safety Requirement
IVML	*In Vivo* Measurements Laboratory
IWSST	Institutional Worker Safety and Security Team
Kg/yr	kilogram/year
KSL	KBR/Shaw/LATA
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
LANSCE	Los Alamos Neutron Science Center
LASO	Los Alamos Site Office
LDCC	Laboratory Data and Communication Center
linac	linear accelerator
LLW	low-level radioactive waste
m3	cubic meter
m3/yr	cubic meters per year
MCL	maximum contaminant level
MDA	material disposal area
MeV	million electron volts
MGY	million gallons per year
MLLW	mixed low-level radioactive waste
MOX	mixed oxide (fuel)
MSGP	Multi-Sector General Permit
MSL	Materials Science Laboratory
MTS	Materials Test Station
MW	megawatt
NEPA	National Environmental Policy Act
NES	nuclear environmental site
NF	Nuclear Facility
NFA	no further action
NHC	Nuclear Hazard Classification
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMSSUP	Nuclear Materials Safeguards and Security Upgrades Project
NNSA	National Nuclear Security Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NS2	National Security Nuclear Science
OSRP	Offsite Source Recovery Project
P2	Pollution Prevention
PC	Performance Category
PCB	polychlorinated biphenyl
PNM	Public Service Company of New Mexico
POC	point of contact
PRB	permeable reactive barrier
PRS	potential release site
PV	photovoltaic
RCRA	Resource Conservation and Recovery Act
rem	roentgen equivalent man
RLUOB	Radiological Laboratory/Utility/ Office Building
RLW	Radioactive Liquid Waste

RLWTF	Radioactive Liquid Waste Treatment Facility
ROD	Record of Decision
SA	Supplement Analysis
SAD	Safety Assessment Document
SAL	screening action level
SEIS	Supplemental Environmental Impact Statement
SERF	Sanitary Effluent Recycling Facility
SHPO	State Historic Preservation Officer
SNM	special nuclear material
SOC	Securing Our Country (LANL Protective Force)
SPEIS	Supplemental Programmatic Environmental Impact Statement
SRCW	Solid Radioactive and Chemical Waste
SST	Safe, Secure Trailer
SVE	soil vapor extraction
SWEIS	Site-Wide Environmental Impact Statement
SWSC	Sanitary Wastewater Systems Consolidation
SWMU	solid waste management unit
SWPPP	Storm Water Pollution Prevention Plan
SWWS	Sanitary Wastewater Systems
TA	Technical Area
TAIZ	technical area isolation zone
TAL	Target Action Level
TED	total effective dose
TFF	Target Fabrication Facility
TRC	Total Recordable Case (rate)
TRP	TA-55 Reinvestment Project
TRU	transuranic
TSFF	Tritium Science and Fabrication Facility
TSTA	Tritium Systems Test Assembly (facility)
UC	University of California
VOC	volatile organic compound
VPP	Voluntary Protection Program
WCRR	Waste Characterization, Reduction, and Repackaging (Facility)
WETF	Weapons Engineering Tritium Facility
WIPP	Waste Isolation Pilot Plant
WMin	Waste Minimization
WNR	Weapons Neutron Research (facility)
WMRM	Waste Management Risk Mitigation Facility
WSST	Worker Safety and Security Team

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1.0 Introduction

1.1 The Site-Wide Environmental Impact Statement

In 1999, the US Department of Energy (DOE)[1] published a Site-Wide Environmental Impact Statement (SWEIS) for Continued Operation of the Los Alamos National Laboratory (LANL or the Laboratory) (DOE 1999a). DOE issued its Record of Decision (ROD) on this SWEIS in September 1999 (DOE 1999b). The ROD identified the decisions DOE made on levels of operation for Los Alamos National Laboratory for the foreseeable future.

As per DOE regulations, the DOE/National Nuclear Security Administration (NNSA) in 2004 initiated preparation of a Supplement Analysis for the Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory (NNSA 2004). The purpose of the supplement analysis was to determine if the existing SWEIS remains adequate. In August 2005, DOE/NNSA issued a memo directing LANL to prepare a new SWEIS (NNSA 2005). A new SWEIS was determined to be the appropriate level of analysis for compliance with the National Environmental Policy Act (NEPA) as a result of the required five-year adequacy review of the 1999 LANL SWEIS. Environmental impacts of specific projects for LANL facility replacements and refurbishments, as well as projects having to do with operational changes, were analyzed.

The new SWEIS was issued in June 2008 (DOE 2008a). In September 2008, DOE/NNSA issued the first ROD for the 2008 SWEIS (DOE 2008b). Concurrently, DOE/NNSA was analyzing actions described in the Complex Transformation Supplemental Programmatic Environmental Impact Statement (Complex Transformation SPEIS or SPEIS) (DOE 2008c). DOE/NNSA decided not to make any decisions regarding nuclear weapons production prior to the completion of the SPEIS. As a result, DOE/NNSA chose the No Action Alternative with the addition of some elements of the Expanded Operations Alternative in this initial ROD (DOE 2008b).

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[1] Congress established the National Nuclear Security Administration (NNSA) within the DOE to manage the nuclear weapons program for the United States. Los Alamos National Laboratory (LANL or Laboratory) is one of the facilities now managed by the NNSA. The NNSA officially began operations on March 1, 2000. Its mission is to carry out the national security responsibilities of the DOE, including maintenance of a safe, secure, and reliable stockpile of nuclear weapons and associated materials capabilities and technologies; promotion of international nuclear safety and nonproliferation; and administration and management of the naval nuclear propulsion program.

The second ROD for the 2008 SWEIS was issued in June 2009 (DOE 2009a). The ROD was based on the information and analyses contained in the SWEIS and other factors, including comments received on the SWEIS, costs, technical and security considerations, and the missions of NNSA. Again, DOE/NNSA chose the No Action Alternative with the addition of some elements of the Expanded Operations Alternative in this ROD (DOE 2009a).

The first Supplement Analysis to the 2008 SWEIS was issued in October 2009 (DOE 2009b). This analysis was prepared to determine if the 2008 SWEIS adequately bounded off-site transportation of low-specific-activity, low-level radioactive waste (LLW) by a combination of truck and rail to EnergySolutions in Clive, Utah. DOE/NNSA concluded that the proposed shipment of waste to EnergySolutions by truck and rail is bounded by the 2008 SWEIS transportation analysis.

1.2 Annual Yearbook

To enhance the usefulness of the SWEIS, DOE/NNSA and LANL implemented a program in which they would make annual comparisons between SWEIS projections and actual operations via an annual Yearbook. The Yearbook's purpose is not to present environmental impacts or environmental consequences but rather to provide data that could be used to develop an impact analysis. The Yearbook focuses on the following information:

- *Facility and process modifications or additions.* These include projected activities for which NEPA coverage was provided by the SWEIS and some post-SWEIS activities for which environmental coverage was not provided. In the latter case, the Yearbook identifies the additional NEPA analyses (i.e., categorical exclusions, environmental assessments, or environmental impact statements) that were prepared.
- *The types and levels of operations during the calendar year (CY).* Types of operations are described using capabilities defined in the 2008 SWEIS. Levels of operations are expressed in units of production, numbers of researchers, numbers of experiments, hours of operation, and other descriptive units (Appendix A).
- *Operations data for the Key and Non-Key Facilities, comparable to data projected in the SWEIS.* Data for each facility include waste generated, air emissions, and liquid effluents (Appendix A).
- *Site-wide effects of operations for the CY.* These include measures such as number of workers, radiation doses, workplace incidents, utility requirements, air emissions, liquid effluents, and solid wastes. These effects also include changes in the regional aquifer, ecological resources, and other resources for which the

DOE has long-term stewardship responsibilities as an administrator of federal lands.

- *Summary and conclusion.* This chapter—Chapter 4—summarizes CY 2010 for LANL in terms of overall facility constructions and modifications, facility operations and operations data, and environmental parameters. These data form the basis of the conclusion for whether or not LANL is operating within the envelope of the 2008 SWEIS.
- *Chemical usage and emissions data (Appendix B)*. These data summarize the chemical usage and air emissions by Key Facility.
- *Nuclear facilities list (Appendix C).* This appendix provides a summary of the facilities identified as having a nuclear Hazard Category[2] (HazCat) at the time the SWEIS was developed through CY 2010.
- *A less-than-HazCat-3 nuclear facilities list (Appendix D).* These data identify the facilities considered as radiological in CY 2010 and indicate their categorization at the time the SWEIS was developed.
- *Pollution Prevention (P2) Awards (Appendix E)*. This appendix provides a summary of the DOE 2010 P2 Awards for LANL.

Data for comparison come from a variety of sources, including facility records, operations reports, facility personnel, and the annual Environmental Surveillance Report. The focus on operations, rather than on programs, missions, or funding sources, is consistent with the approach of the SWEIS.

The annual Yearbooks provide DOE/NNSA with information needed to evaluate adequacy of the SWEIS and enable them to make decisions on when and if a new SWEIS is needed. The Yearbooks also provide LANS managers with a guide to determine whether activities are within the SWEIS operating envelope. The Yearbooks serve as a summary of environmental information collected and reported by the various groups at LANL.

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2 DOE Order 5480.23 (DOE 1992a) categorizes nuclear hazards as Category 1, Category 2, or Category 3. Because LANL has no Category 1 nuclear facilities (usually applied to nuclear reactors), definitions are presented for only Categories 2 and 3:

- Category 2 Nuclear Hazard – has the potential for significant on-site consequences. DOE-STD-1027-92 (DOE 1992b) provides the resulting threshold quantities for radioactive materials that define Category 2 facilities.
- Category 3 Nuclear Hazard – has the potential for only significant localized consequences. Category 3 is designed to capture those facilities such as laboratory operations, LLW handling operations, and research operations that possess less than Category 2 quantities of material. DOE-STD-1027-92 (DOE 1992b) provides the Category 3 thresholds for radionuclides. The identification of nuclear facilities is based upon the official list maintained by DOE Los Alamos Site Office (LASO) as of December 2002 (LANL 2002a).

1.3 CY 2010 Yearbook

This Yearbook represents data collected for CY 2010. This Yearbook compares data from CY 2010 to the 2008 SWEIS projections. The collection of data on facility operations is a unique effort. The type of information developed for the SWEIS is not routinely collected at LANL. Nevertheless, this information is the heart of the SWEIS and the Yearbook, and the description of current operations and indications of future changes in operations are believed to be sufficiently important to warrant an incremental effort.

2.0 Facilities and Operations

LANL has about 1,100 structures with approximately eight million square feet under roof, spread over an area of approximately 36 square miles of land owned by the US government and administered by DOE/NNSA. Much of LANL is undeveloped to provide a buffer for security, safety, and expansion possibilities for future use. Approximately half of the square footage at the site is considered laboratory or production space; the remaining square footage is considered administrative, storage, service, and other space. While the number of structures changes with time (there is frequent addition or removal of temporary structures and miscellaneous buildings), the current breakdown is about 845 permanent buildings and 282 temporary structures (trailers and transportables). According to the Laboratory's Infrastructure Planning Division, in CY 2010 LANS leased approximately 40 buildings within the Los Alamos town site.

To present a logical, comprehensive evaluation of the potential environmental impacts at LANL, the 1999 SWEIS developed the Key Facility concept, a framework for analyzing the types and levels of activities performed across the entire site. This framework assisted in analyzing the impacts of activities in specific locations (TAs) and the impacts related to specific programmatic operations (Key Facilities and capabilities). Taken together, the 15 Key Facilities represent the majority of environmental risks associated with LANL operations. The 15 Key Facilities identified were both critical to meeting mission assignments and

- Housed operations that have the potential to cause significant environmental impacts,
- Were of most interest or concern to the public (based on comments in the 1999 and 2008 SWEIS public hearings), or
- Would be subject to change because of DOE/NNSA programmatic decisions.

In 2008, Pajarito Site (TA-18) was placed into Surveillance and Maintenance mode. All operations have ceased and the facility was downgraded to a Less-than-HazCat 3 Nuclear Facility (DOE 2010a). For the purpose of the 2008, 2009, and 2010 SWEIS Yearbooks, Pajarito Site has been removed as a Key Facility. In addition, the 2008 SWEIS recognized the Nicholas C. Metropolis Center (formerly known as the Strategic Computing Complex) as a new Key Facility because of the amounts of electricity and water it may consume. The remainder of LANL was called "Non-Key," not to imply that these facilities were any less important to the accomplishment of critical research and development, but because they did not fit the above criteria for Key Facilities (DOE 1999a).

The Key Facilities, as presented in the 1999 SWEIS, comprised 42 of the 48 HazCat 2 and HazCat 3 Nuclear Structures at LANL. Since the issuance of the 1999 SWEIS, DOE/NNSA and LANS have published 11 lists identifying nuclear facilities at LANL that significantly changed the classification of some buildings. Appendix C provides a summary of the current nuclear facilities; a table has been added to each section of this chapter to explain the differences and identify the 19 nuclear facilities currently listed by DOE/NNSA. Of these 19 facilities, all but nine reside within a Key Facility. Appendix D provides a comparison of the facilities identified as Less-than-HazCat-3 Nuclear Facility when the 2008 SWEIS was prepared (formerly known as radiological facilities) (LANL 2009a).

With the issuance of 10 CFR 830 on January 10, 2001, on-site transportation also needs to be addressed relative to nuclear hazard categorization (FR 2001). This is a change from the 1999 SWEIS. At the time the 1999 SWEIS was published, on-site transportation was considered part of the affected environment in Section 4.10.3.1. The on-site transportation of nuclear materials greater than or equal to HazCat 3 quantities is addressed in a DOE-approved safety analysis (DOE 2002a, Steele 2002).

The definition of each Key Facility hinges upon operations,[1] capabilities, and location and is not necessarily confined to a single structure, building, or TA. In fact, the number of structures comprising a Key Facility ranges from one (e.g., the Target Fabrication Facility [TFF]) to more than 400 structures comprising the LANSCE Key Facility. Key Facilities can also exist in more than a single TA, as is the case with the High Explosives Testing and High Explosives Processing Key Facilities, which exist in all or as parts of five and six TAs, respectively.

This chapter discusses each of the 15 Key Facilities from three aspects: significant facility construction and modifications, types and levels of operations, and environmental effects of operations that have occurred during 2010. Each of these three aspects is given perspective by comparing them to projections made by the SWEIS. This comparison provides an evaluation of whether or not data resulting from LANL operations continue to fall within the environmental envelope established in the 2008 SWEIS. It should be noted that modifications and construction activities that were completed before 2008 are summarized in the previous Yearbooks.

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[1] As used in the 1999 and 2008 SWEISs and this Yearbook, facility operations include three categories of activities: research, production, and services to other LANL organizations. Research is both theoretical and applied. Examples include modeling (e.g., atmospheric weather patterns) to subatomic investigations (e.g., using the Los Alamos Neutron Science Center [LANSCE] linear accelerator [linac]) to collaborative efforts with industry (e.g., fuel cells for automobiles). Production involves delivery of a product, such as plutonium pits or medical radioisotopes. Examples of services provided to other LANL facilities include utilities and infrastructure support, analysis of samples, environmental surveys, and waste management.

This chapter also discusses Non-Key Facilities, which include buildings and structures not part of a Key Facility, or the balance of LANL. The Non-Key Facilities represent a significant fraction of LANL and comprise all or the majority of 30 of 49 TAs, including TA-00, which comprises leased space within the Los Alamos town site and TA-57 at Fenton Hill, and approximately 14,224 of LANL's 26,058 acres. The Non-Key Facilities include such important buildings and operations as the Nonproliferation and International Security Center (NISC); the National Security Sciences Building (NSSB), the main administration building; and the TA-46 Sanitary Wastewater System (SWWS). Table 2-1 identifies and compares the acreage of the 15 Key Facilities and the Non-Key Facilities. Figure 2-1 shows the location of LANL within northern New Mexico, while Figure 2-2 illustrates the locations of the TAs and the Key Facilities.

Table 2-1. Key and Non-Key Facilities

Facility	Technical Areas	~Size (acres)
Key Facilities		
Chemistry and Metallurgy Research (CMR) Building	TA-03	14
Sigma Complex	TA-03	10
Machine Shops	TA-03	7
Materials Science Laboratory (MSL)	TA-03	2
Nicholas C. Metropolis Center	TA-03	5
High Explosives Processing (HEP)	TAs 08, 09, 11, 16, 22, 37	1,115
High Explosives Testing (HET)	TAs 15, 36, 39, 40	8,691
Tritium Facility	TA-16	18
Target Fabrication Facility (TFF)	TA-35	3
Bioscience Facilities	TAs 43, 03, 16, 35, 46	4
Radiochemistry Facility	TA-48	116
Radioactive Liquid Waste Treatment Facility (RLWTF)	TA-50	62
Los Alamos Neutron Science Center (LANSCE)	TA-53	751
Solid Radioactive and Chemical Waste Facilities	TA-50 & TA-54	943
Plutonium Complex	TA-55	93
Subtotal, Key Facilities	**19 of 49 TAs**	**11,834**
All Non-Key Facilities	**30 of 49 TAs**	**14,224**
Total, LANL		**26,058**

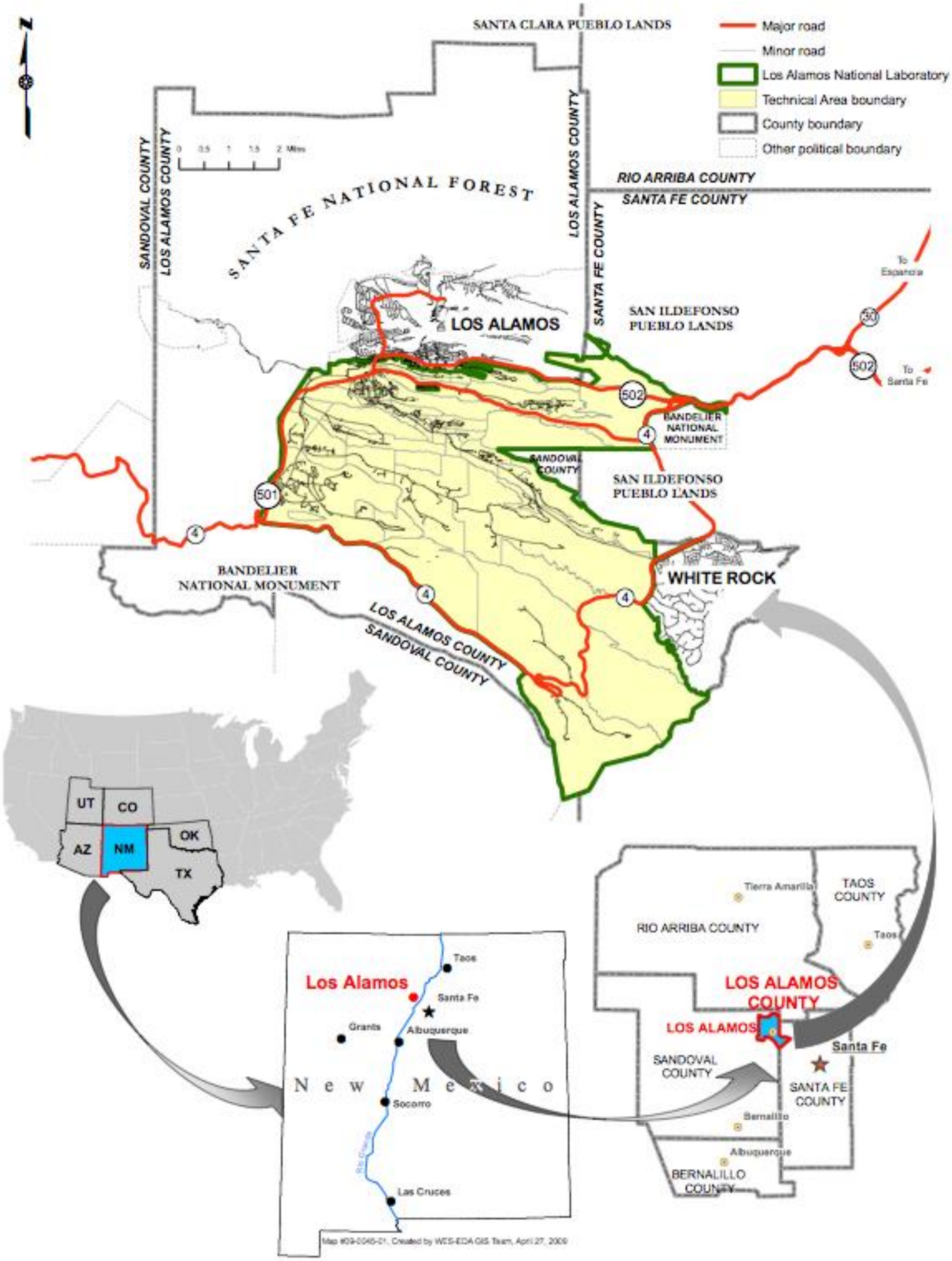

Figure 2-1. Location of LANL

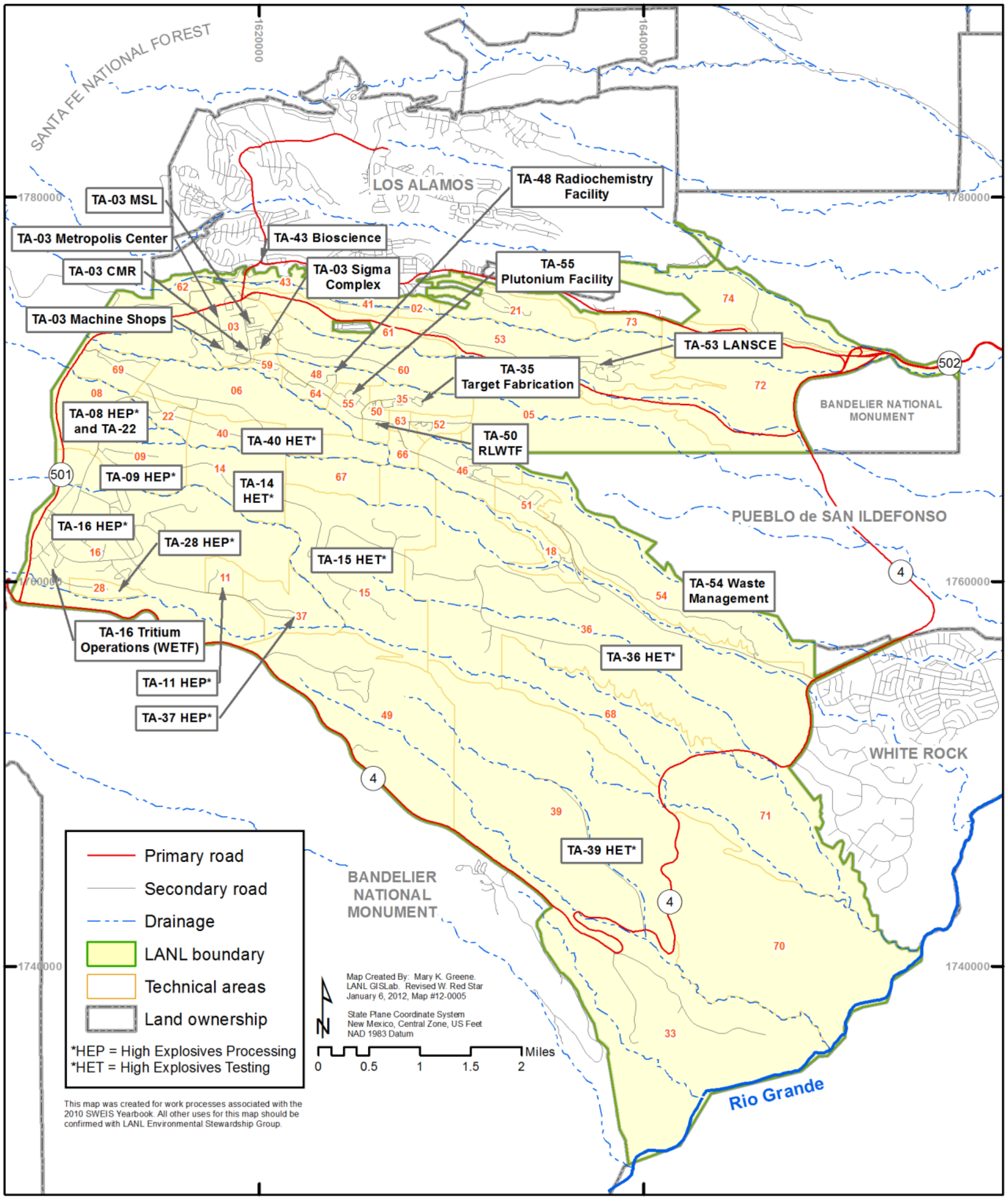

Figure 2-2. Location of Technical Areas and Key Facilities

2.1 CMR (TA-03)

The CMR Building was designed and constructed to the 1949 Uniform Building Code and occupied in 1952 to house analytical chemistry, plutonium metallurgy, uranium chemistry, and engineering design and drafting activity. At the time the 1999 SWEIS was issued, the CMR Building was described as a "production, research, and support center for actinide chemistry and metallurgy research and analysis, uranium processing, and fabrication of weapon components."

The CMR Facility is 550,000 square feet that consists of a main building (TA-03-0029) and a LLW Storage and Transfer Facility (TA-03-0154) that is no longer operational. The CMR Building consists of three floors: basement, first floor, and attic. It has seven independent wings connected by a common corridor.

As shown in Table 2-2, the CMR Facility was designated a HazCat 2 Nuclear Facility. CMR is also designated a Security Category 3 Nuclear Facility.

Table 2-2. CMR Buildings with Nuclear Hazard Classification

Building	Description	2008 SWEIS	NHC LANL 2010*
TA-03-0029	CMR	2	2

* DOE List of Los Alamos National Laboratory Nuclear Facilities (DOE 2010a).

Table 2-2 and the Nuclear Hazard Classification (NHC) tables in the other sections of this Yearbook reflect the data in the published DOE listings of LANL Nuclear Facilities and LANL Less-than-HazCat-3 Nuclear Facilities that applied during the CY under review, in this case 2010. Changes in the listings that have occurred during the year will not be reflected in Table 2-2 or other NHC tables if they are not yet published in the DOE listings. However, changes in the NHC will be noted in the text of this section.

2.1.1 Construction and Modifications at the CMR Building

The 2008 SWEIS projected two changes to this Key Facility:

- Replace the CMR building—construct and operate a CMR Replacement (CMRR) Nuclear Facility (NF) at TA-55 and
- Decontamination, decommissioning, and demolition (DD&D) of the CMR Building.

In November 2003, DOE/NNSA issued an Environmental Impact Statement for the Chemistry and Metallurgy Research Building Replacement Project (CMRR EIS) (DOE 2003a), which evaluated the potential environmental impacts resulting from activities associated with consolidating and relocating the mission-critical CMR Building capabilities at LANL and replacement of the CMR Building. In its ROD issued in February 2004, the DOE/NNSA decided to replace the CMR Building with a new CMRR NF at TA-55 and to completely vacate and demolish the CMR Building (DOE 2004). The ROD stated that the new facility would be established as a HazCat 2 Nuclear Facility. In January 2005, a Supplement Analysis (SA) (DOE 2005) to the CMRR EIS was written to determine if the environmental impacts of proposed changes to the location of the CMRR NF components were adequately addressed in the CMRR EIS. NNSA/DOE determined that the proposed actions were adequately bounded by the analyses of impacts projected by the 2003 CMRR EIS, and at the time no Supplemental CMRR EIS was required. The CMRR NF would replace the CMR Building as the Key Facility.

On September 28, 2010, DOE/NNSA published a Notice of Intent (NOI) to prepare a Supplemental Environmental Impact Statement (SEIS) for the CMRR NF in the Federal Register. Since the issuance of the CMRR EIS ROD in 2004, new geologic information regarding seismic conditions caused DOE/NNSA to change some design aspects of the CMRR NF. The SEIS will assess the potential environmental impacts of these proposed changes and of the construction and operation of the nuclear facility portion of the CMRR NF. The NOI was followed by a 30-day scoping/public comment period. The final SEIS is anticipated to be issued by July 2011.

Although construction of the CMRR NF has not begun, several projects have been started and are listed below:

- CMRR Geotechnical Investigation (LANL 2002b), the first phase in determining the feasibility of constructing the CMRR**.** Geotechnical surveys were performed in CY 2003.
- CMRR Project DOE Pre-conceptual Design (LANL 2001a), ongoing in CY 2010.
- In 2007, construction of the Radiological Laboratory/Utility/Office Building (RLUOB) began. Construction was ongoing in CY 2010. Beneficial occupancy expected in CY 2011.

During CY 2003, modifications to Wing 9 were started in support of the Containment Vessel Disposition (CVD) Project (previously known as the Bolas Grande Project), which would provide for the disposition of large vessels previously used to contain experimental explosive shots involving various actinides. NEPA coverage for this project was provided by a SA to the 1999 Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory for the Proposed Disposition of Certain Large Containment Vessels, DOE/EIS-0238-SA-03 (DOE 2003b). The project was placed on hold in 2004 based on a decision by NNSA that the project was a major modification. This decision was later rescinded and the project moved forward in 2009. In 2010, installation of the CVD enclosure and glovebox began. Completion of these activities is expected in 2011.

CMR Safety Basis. The CMR Facility Safety Basis documentation currently consists of the 1998 Basis for Interim Operations (BIO) and associated Interim Technical Safety Requirements (ITSRs), which expire in 2010. Updates to the CMR BIO and ITSRs were submitted in April 2004 but rejected in April 2005 by DOE/NNSA, which then directed that the ITSRs be updated. The ITSR update, which represents improvements in the Safety Basis through changes to existing or additional controls, was approved by NNSA in CY 2008. On December 10, 2010, the CMR Documented Safety Analysis (DSA) was approved and became the documented Safety Basis for the facility.

While the CMR Facility continues to maintain normal operations in support of the Pit Manufacturing and Surveillance missions, an effort to reduce the overall risk of the facility was begun in 2006. The scope of the CMR Facility Risk Reduction Project includes relocating hazardous activities from Wings 2 and 4 that were considered particularly vulnerable to seismic activity to other areas of the facility or to another site. In 2008, Wing 3 was vacated and the Risk Reduction Project started relocating hazards to Wings 5 and 7 and to other facilities at LANL. Work continued on the Risk Reduction Project in 2010.

2.1.2 Operations at the CMR Building

The 2008 SWEIS identified seven capabilities for this Key Facility. Three of the seven capabilities were active in CY 2010 and below SWEIS projections (Table A-1).

2.1.3 Operations Data for the CMR Building

Operations data from research, services, and production activities at the CMR Building were well below those projected in the SWEIS. Table A-2 provides details.

2.2 Sigma Complex (TA-03)

The Sigma Complex Key Facility consists of four principal buildings: the Sigma Building (03-0066), the Beryllium Technology Facility (BTF; TA-03-0141), the Press Building (TA-03-0035), and the Forming Building (previously referred to as the Thorium Storage Building; TA-03-0159), and several support and storage facilities. Primary activities are the fabrication of metallic and ceramic items, characterization of materials, and process research and development.

The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a) identified 11 buildings within this Key Facility. Table 2-3 provides details.

Table 2-3. Sigma Buildings Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2010*
TA-03-0002	X-Ray Machine Lab	RAD
TA-03-0032	Superconducting Tech Center	RAD
TA-03-0035	Press Building	RAD
TA-03-0065	Source Storage Building	RAD
TA-03-0066	Sigma Building	RAD
TA-03-0141	BTF	RAD
TA-03-0159	Forming Building	RAD
TA-03-0169	Warehouse	RAD
TA-03-0317	BTF Graphite Storage	RAD
TA-03-0541	Sigma Storage Shed	RAD
TA-03-2132	Sigma Safety Storage Shed	RAD

* LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a)

2.2.1 Construction and Modifications at the Sigma Complex

The 2008 SWEIS projected no new construction or major modifications to this Key Facility.

Building TA-03-2519, an ion exchange building, was added to the Sigma Complex in 2010 to reduce copper concentrations in order to meet new effluent discharge limits established in the new National Pollutant Discharge Elimination System (NPDES) permit.

2.2.2 Operations at the Sigma Complex

The 2008 SWEIS identified three capabilities for the Sigma Complex (Table A-3). Activity levels for all capabilities during CY 2010 were less than levels projected in the 2008 SWEIS.

2.2.3 Operations Data for the Sigma Complex

In CY 2010, levels of research and operations were less than those projected in the 2008 SWEIS; consequently, all of the operations data were also below projections. Table A-4 provides details.

2.3 Machine Shops (TA-03)

The Machine Shops Key Facility consists of two buildings, the Nonhazardous Materials Machine Shop (TA-03-0039) and the Radiological Hazardous Materials Machine Shop (TA-03-0102). Both buildings are located within the same exclusion area. Activities consist of machining, welding, fabrication, inspection, and assembly of various materials in support of many LANL programs and projects. The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a) identified two buildings within this Key Facility. Table 2-4 provides details.

Table 2-4. Machine Shops Buildings Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2010*
TA-03-0039	Nonhazardous Materials Machine Shop	RAD
TA-03-0102	Radiological Hazardous Materials Machine Shop	RAD

* LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a)

2.3.1 Construction and Modifications at the Machine Shops

The 2008 SWEIS projected no new construction or major modifications to the Machine Shops.

Historically, TA-03 building 39, room 16 served as a principal beryllium machine shop for LANL from the early 1950s to 1999. Beryllium operations and materials have been relocated to the BTF (TA-03-0141). In 2009, all machinery and facility equipment was removed from room 16 and decontaminated to acceptable release levels for light laboratory use in the future (LANL 2008a).

2.3.2 Operations at the Machine Shops

The 2008 SWEIS identified three capabilities at the shops (Table A-5). In CY 2010, all activities occurred at levels well below those projected in the SWEIS. The workload at the Machine Shops is directly linked to research and development and production requirements.

2.3.3 Operations Data for the Machine Shops

Operations data were well below projections by the SWEIS. Table A-6 provides details.

2.4 Materials Science Laboratory (TA-03)

The MSL Key Facility consists of a single laboratory building (TA-03-1698) containing 27 labs, 60 offices, 21 materials research areas, and support rooms. In CY 2004, construction was completed on the Material Science and Technology Office Building (TA-03-1415). In CY 2007, the newly constructed Center for Integrated Nanotechnologies (TA-03-1420) was in full operation. The two-story, 36,500-square-foot building houses approximately 50 people. Occupants include LANL staff plus collaborators from universities, other laboratories, and private industry. All activities within this Key Facility are related to research and development of materials science. The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a) includes the MSL (Table 2-5).

Table 2-5. MSL Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2010*
TA-03-1698	Materials Science Laboratory	RAD

* LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a)

2.4.1 Construction and Modifications at the Materials Science Laboratory

The 2008 SWEIS projected no new construction or major modifications to this Key Facility.

2.4.2 Operations at the Materials Science Laboratory

The 2008 SWEIS identified four capabilities at the MSL: materials processing, mechanical behavior in extreme environments, advanced materials development, and materials characterization.

In CY 2010, activity levels for all capabilities were as projected in the SWEIS. However, materials processing was expanded. Table A-7 compares CY 2010 operations to projections made by the SWEIS.

2.4.3 Operations Data for the Materials Science Laboratory

Operations data levels have been lower than projected in the SWEIS. Radioactive air emissions continue to be negligible and, therefore, were not measured. Table A-8 provides details.

2.5 Nicholas C. Metropolis Center for Modeling and Simulation (TA-03)

The Nicholas C. Metropolis Center (Metropolis Center) for Modeling and Simulation is a Key Facility in the 2008 SWEIS. The facility, which began operating in 2002, is housed in a three-story, 303,000-square-foot structure in TA-03. The Metropolis Center (TA-03-2327) is the home of the Roadrunner Supercomputer (currently one of the world's fastest and most advanced computers), which is an integral part of the tri-laboratory (LANL, Lawrence Livermore National Laboratory, and Sandia National Laboratories) mission to maintain, monitor, and ensure the Nation's nuclear weapons performance through the Advanced Simulation and Computing Program. The Metropolis Center, together with the Laboratory Data Communication Center (LDCC), the Central Computing Facility (CCF), and the Advanced Computing Laboratory (ACL), forms the center for high-performance computing at LANL.

The impacts associated with operating the Metropolis Center (formerly called the Strategic Computing Complex) at an initial capacity of a 50-teraflop platform were analyzed in the Environmental Assessment for the Proposed Strategic Computing Complex, Los Alamos National Laboratory, Los Alamos, New Mexico (DOE/EA-1250) (DOE 1998a) and its associated Finding of No Significant Impact (FONSI). The proposed increase in the operating platform beyond 50 teraflops to support approximately 1,000 teraflops (1 petaflop) was analyzed in the SWEIS. The exact level of operations supported cannot be directly correlated to a set amount of water or electrical power consumption. Each new generation of computing capability machinery continues to be designed with enhanced efficiency in terms of both electrical consumption and cooling requirements. Therefore, the computing level that can be supported by about 15 megawatts (MW) of electrical usage and 51 million gallons per year of water has been used as an upper limit for computer acquisition at the Metropolis Center.

2.5.1 Construction and Modifications at the Metropolis Center

The 2008 SWEIS projected one facility modification at this Key Facility:

- Installation of additional processors to increase functional capability. This expansion would involve the addition of mechanical and electrical equipment, including chillers, cooling towers, and air conditioning units.

The first computer to be located in the Metropolis Center was called "Q." The facility was initially constructed to have adequate power and cooling for the first computer, and space was allocated for future expansion of the electrical and mechanical systems as new and more powerful computers arrived.

Since that time, there have been several "supercomputers" housed in the Metropolis Center, including Lightning, Bolt, Redtail, Hurricane, and Roadrunner. In preparation for these machines, the electrical and mechanical systems in the facility were expanded to meet the new computers' requirements. During 2010, both Lightning and Bolt were decommissioned, and Roadrunner became the primary computer resource for LANL's weapons workload. A new computer, Cielo, arrived in the fourth quarter of 2010. It is being integrated into the stable of computers at the Metropolis Center and should be ready for production work beginning October 2011. Cielo consumes approximately 3 MW of power.

To prepare the Metropolis Center for the arrival of Cielo, the infrastructure required an upgrade to the power and cooling at the site. A 1,200-ton chiller and cooling tower were installed as well as 14 40-ton air handling units. Three 3-MW heat exchangers were also added in preparation for future water-cooled systems. The electrical substations were reconfigured so that they could be used in the future as single-ended substations. (Currently, they are in a double-ended configuration.) This reconfiguration would allow double the amount of power available to the computing floor; however, some redundancy may be sacrificed if used in this manner.

2.5.2 Operations at the Metropolis Center

As described in the 2008 SWEIS, the Metropolis Center computing platform would expand the capabilities and operations levels in support of the Roadrunner Supercomputer. Computer operations are performed 24 hours a day, with personnel occupying the control room to support computer operation activities around the clock. Operations consist of office-type activities, light laboratory work such as computer and support equipment assembly and disassembly, and computer operations and maintenance. The Metropolis Center has capabilities to enable remote-site user access to the computing platform, and its co-laboratories and theatres are equipped for distance operations to allow collaboration between weapons designers and engineers across the DOE weapons complex.

Computer simulations have become the only means of integrating the complex processes that occur in the nuclear weapon lifespan. Large-scale calculations are now the primary tools for estimating nuclear yield and evaluating the safety of aging weapons in the nuclear stockpile. Continued certification of aging stockpile safety and reliability depends upon the ability to perform highly complex, three-dimensional computer simulations. Table A-9 provides details.

2.5.3 Operations Data for the Metropolis Center

The environmental measure of activities at the Metropolis Center is the amount of electricity and water it may use. The 2008 SWEIS analyzed the operating levels to be supported by approximately 15 MW of electrical usage and 51 million gallons (193 million liters) per year of water. Metropolis Center water consumption is not metered. Water usage will be reported once the facility is metered. In CY 2010, outfall discharge amounts exceeded 2008 SWEIS projections. The Sanitary Effluent Recycling Facility (SERF) is expected to greatly reduce discharge amounts. In 2011, the SERF expansion is expected to be completed. This facility would allow the use of reclaimed water, to be used in the cooling tower, greatly reducing the use of potable water. Table A-10 presents operations data for CY 2010.

2.6 High Explosives Processing (TA-08, TA-09, TA-11, TA-16, TA-22, TA-37)

The HEP Key Facility is located in all or parts of six TAs. Building types include production and assembly facilities, analytical and synthesis laboratories, test facilities, explosives storage magazines, units for treating hazardous explosive waste by open burning, and a facility for treatment of explosive-contaminated wastewaters. Activities consist primarily of manufacture and assembly of high explosives components for nuclear weapons, Science-Based Stockpile Stewardship Program tests and experiments, and global security/threat reduction missions. Environmental and safety tests are performed at TA-11 and TA-09 while TA-08 houses radiography activities.

The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a) identified 31 buildings within this Key Facility. Table 2-6 provides details.

Table 2-6. High Explosives Processing Buildings Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2010*
TA-08-0022	X-Ray Facility	RAD
TA-08-0023	Betatron Building	RAD
TA-08-0070	Nondestructive Testing and Evaluation	RAD
TA-08-0120	Radiography	RAD
TA-11-0002	Vibration Test	RAD
TA-11-0030	Vibration Test Bldg	RAD
TA-11-0036	Storage Magazine	RAD
TA-11-0065	Burn Pit	RAD
TA-16-0202	Laboratory	RAD
TA-16-0207	Component Testing	RAD
TA-16-0260	High Explosive Pressing, Machining, and Inspection	RAD
TA-16-0261	Component Storage	RAD
TA-16-0263	Component Storage	RAD
TA-16-0267	Component Storage	RAD
TA-16-0280	Inspection Building	RAD
TA-16-0281	Rest House	RAD
TA-16-0283	Component Storage	RAD
TA-16-0285	Component Storage	RAD
TA-16-0300	Component Storage	RAD
TA-16-0301	Component Storage	RAD
TA-16-0302	Component Storage/Training	RAD
TA-16-0307	Component Storage	RAD
TA-16-0332	Component Storage	RAD
TA-16-0410	Assembly Building	RAD
TA-16-0411	Assembly Building	RAD
TA-16-0413	Component Storage	RAD
TA-16-0414	Storage Building	RAD
TA-16-0415	Component Storage	RAD

Building	Description	LANL 2010*
TA-16-0955	Component Storage	RAD
TA-37-0004	Storage Magazine	RAD
TA-37-0010	Storage Magazine	RAD

* LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a)

Operations are performed by personnel in multiple directorates, divisions, and groups. These operations include high explosives manufacturing and assembly work; chemical synthesis of new explosives; explosives analytical and testing services; research and development of new initiation systems; production of stockpile detonators and initiation devices; and nondestructive testing and evaluation. All explosives at LANL are managed through this Key Facility where they are stored as raw materials, pressed into solid shapes, and machined to customers' specifications. The completed shapes are shipped to customers on- and off-site for use in experiments and open detonations. Personnel at TA-09 produce a small quantity of high explosives during the year from basic chemistry and lab-scale synthesis operations. Other groups use small quantities of explosives for manufacturing and testing of detonators and initiating devices. Detonable waste explosives from pressing and machining operations and excess explosives are treated by open burning or open detonation. Non-detonable high explosive contaminated wastes are sent to off-site facilities for treatment/disposal.

Information from multiple divisions is combined to capture operational parameters for manufacturing, production, and processing high explosives.

2.6.1 Construction and Modifications at High Explosives Processing

The 2008 SWEIS projected the following modifications to this Key Facility:

- Complete construction of TA-16 Engineering Complex
- Removal or demolition of vacated structures that are no longer needed

All high explosives burning operations have been consolidated at TA-16-0388 and TA-16-0399. Burning operations are generally limited to TA-16-0388, although TA-16-0399 is still available for burning of bulk high explosives. The TA-16-0388 burn unit was upgraded in the 1990s in anticipation of this consolidation to improve capacity and efficiency and minimize environmental impacts.

In CY 2008, High Explosives Engineering vacated the following structures in preparation for transfer to Surveillance and Maintenance: TA-16-0363, -0435, and -0437 and 37-0001, -0002, -0003, -0006, -0008, -0009, -0016, -0017, -0019, -0020, and -0027. High Explosive Packaging and Transportation vacated the 280 line and consolidated its operations in TA-16-0305 and TA-16-0307. There is no longer plastics development at TA-16. Several small transportable office buildings were removed in CY 2009 in support of footprint reduction (see Section 3.11.2 for details), including TA-16-0243, -0245, -0246, -0367, -0898, and -1407. Utility disconnects were completed for many other transportable office buildings in anticipation of their removal in CY 2009 (DOE 1996a, b). Removal of transportable office buildings TA-16-0242, -0244, and -0897 was completed in 2009.

The historic restoration of the TA-08 Gun Site was initiated in CY 2008 with Phase 1 completed in 2009 (DOE 1996c). DD&D of structures TA-08-0026, -0030, -0065, and -0127 was completed (DOE 1998b).

Heavy equipment maintenance operations were relocated from TA-15-0185 to TA-09-0028. TA-09-0028 formerly housed a machine shop (DOE 1996d). Refurbishment of laboratories and electrical infrastructure safety upgrades progressed at TA-09-0021 (DOE 1996e, f).

Removal of the historically significant TA-11 Drop Tower was initiated and completed in CY 2008 (DOE 2002b).

Construction of the new Detonator Storage Facility supporting TA-22 production activities was initiated in CY 2008 and completed in CY 2009 (DOE 2003c).

DD&D of TA-16-0193 Change House and TA-16-1489 was also completed in 2009.

Structural modifications to TA-16-0200 to incorporate an exterior fire egress stairway began in 2010, with completion scheduled for 2011. Electrical upgrades of systems in 16-0301 and 16-0302 were completed in 2010. Modifications to and improvements of the fire alarm system in the TA-16-0260 area were completed (TA-16-0260, -0261, 0263, -0265, -0267)

Modification of the discharge water piping from the TA-11-0030 cooling tower and installation of a 1000 gallon catch tank was completed in CY 2010. These modifications eliminated discharges through the 03A-130 outfall.

2.6.2 Operations at High Explosives Processing

The 2008 SWEIS identified six capabilities for this Key Facility (Table A-11). Activity levels during CY 2010 continued below those projected in the SWEIS. High explosives and characterization operations remained below levels projected in the SWEIS. Plastics research and development is currently being performed in other facilities.

The total amount of explosives and mock explosives used across all activities is an indicator of overall activity levels for this Key Facility. Amounts projected in the 2008 SWEIS were 82,700 pounds of explosives and 2,910 pounds of mock explosives. In CY 2010, less than 2,400 pounds of high explosives and less than 600 pounds of mock explosives material were used in the fabrication of test components for internal and external customers. The LANL High Explosive Science and Technology group (DE-1) synthesized and/or formulated Less than 100 pounds of explosives including HMX, PETN, DAAF, TATB, and XTX compositions. Materials testing at TA-09 expended less than 10 pounds of these explosives. Materials testing at TA-22 expended less than 1 pound of PETN-based detonators.

During CY 2010, approximately 1,500 pounds of water-saturated explosive scrap were generated from machining operations at TA-16 and treated by open burning at the TA-16 burn ground. High explosives processing and high explosives laboratory operations generated approximately 21,000 gallons of explosive-contaminated water, which were treated at the High Explosive Wastewater Treatment Facility (HEWTF) using an evaporator system that resulted in zero liquid discharge. Explosive waste treated by open burning at the TA-16 Burn Ground in CY 2010 included 1,500 pounds of water-saturated scrap, less than 400 pounds of detonable explosives-contaminated filters, and approximately 3,500 pounds of excess high explosives. No explosives-contaminated sand or solvents were treated. Approximately 1,300 gallons of propane and 5 gallons of kerosene were expended to treat these materials. Non-detonable explosive-contaminated equipment was steam cleaned in the 260 facility and salvaged or sent for recycling.

Efforts continued in CY 2010 to develop protocols for obtaining stockpile-returned materials, develop new test methods, and procure new equipment to support requirements for science-based studies on stockpile and energetic materials.

2.6.3 Operations Data for High Explosives Processing

In CY 2010, operations levels were well below projections made by the 2008 SWEIS (Table A-12). Under the new NPDES permit, outfall 05A-097 was eliminated. Two outfalls remain on the permit: outfall 03A-130 (TA-11-0030 Cooling Tower), and outfall 05A-055 (HEWTF). Modification of the TA-11-0030 facility to eliminate discharges through the 03A-130 outfall was completed in CY 2010. There have been no discharges through the 05A-055 outfall at HEWTF for several years due to the evaporator system.

2.7 High Explosives Testing (TA-14, TA-15, TA-36, TA-39, TA-40)

The HET Key Facility is located in all or parts of five TAs, comprises more than one half (22 of 40 square miles) of the land area occupied by LANL, and has 16 associated firing sites. All firing sites are situated in remote locations and/or within canyons. Major buildings are located at TA-15 and include the Dual-Axis Radiographic Hydrodynamic Test (DARHT) facility (TA-15-0312) and the Vessel Preparation Building (TA-15-0534). Building types consist of preparation and assembly facilities, bunkers, analytical laboratories, high explosives storage magazines, and offices. Activities consist primarily of testing munitions and high explosives components for nuclear weapons and for Science-Based Stockpile Stewardship Program tests and experiments and for threat reduction activities. The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a) identified three buildings within this Key Facility. Table 2-7 provides details.

Table 2-7. High Explosives Testing Buildings/Sites Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2010*
TA-15-Firing Site	Firing Site (R307)	RAD
TA-15-R183	Vault	RAD
TA-39-0002	Laboratory/Office Building	RAD

* LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a)

2.7.1 Construction and Modifications at High Explosives Testing

The 2008 SWEIS projected the following modifications to this Key Facility:

- Complete construction of 15 to 25 new structures within the Two-Mile Mesa Complex to replace 59 structures currently used for dynamic experimentation
- Remove or demolish vacated structures that are no longer needed

These projected modifications were not fully realized, and the construction of new facilities within the Two-Mile Mesa Complex was not pursued in 2010. A significant modification was made at the DARHT facility in 2010 by the connection of the cooling tower outfall and septic system into the LANL sanitary sewer. This eliminated the discharge of cooling tower water to one of LANL's NPDES outfalls and removed the septic system for the DARHT complex.

2.7.2 Operations at High Explosives Testing

The 2008 SWEIS identified seven capabilities for this Key Facility. No new capabilities have been added (Table A-13).

Levels of research in 2010 were below those predicted by the 2008 SWEIS. The total amount of depleted uranium expended during testing (all capabilities) is an indicator of overall activity levels at this Key Facility. Less than 10 kilograms of depleted uranium were expended 2010, compared to approximately 3,900 kilograms projected in the 2008 SWEIS. The quantity of expended depleted uranium includes the quantity of depleted uranium expended during material sanitization.

In 2010, three hydrotests were performed at DARHT Intermediate-scale dynamic experiments containing beryllium, single-walled steel containment vessels continued at the Eenie Firing Point (TA-36-0003) along with other programmatic experiments. The use of a steel vessel mitigates essentially all of the fragments and particulate emissions associated with an experiment.

2.7.3 Operations Data for High Explosives Testing

The operations data levels were well below what was projected in the 2008 SWEIS with one exception. Chemical waste generation exceeded 2008 SWEIS projections due to the removal of approximately 40,000 kilograms of industrial wastewater. This wastewater needed to be pumped because of broken waterline; overflow of water used to fill cooling tower; and the flushing of the new fire protection system at TA-15-0312. All water was potable, but because it filled the emergency tank used to capture mineral oil spills during the tests conducted at DARHT it was considered chemical waste. Table A-14 provides details.

2.7.4 Cerro Grande Fire Effects at High Explosives Testing

Continuing Effects. The LANL Environmental Programs (EP) Directorate's Project Management and Field Services Organization continue to monitor the storm water control placements and re-vegetation efforts (best management practices [BMPs]) that were conducted immediately after the Cerro Grande Fire. To date, these efforts, a direct consequence of the fire, appear to be successful in stabilizing soils within the HET facility area of LANL by minimizing run-off and reducing storm water flows onto HET property. These inspection and monitoring efforts continued through CY 2010.

Other fire-related activities involve fuel wood mitigation efforts and continued tree and undergrowth thinning throughout the High Explosives Testing Key Facility.

2.8 Tritium Facilities (TA-16)

The Tritium Key Facilities consists of tritium operations in the Weapons Engineering Tritium Facility (WETF) located at TA-16. In 2008, tritium operations at TA-21, the Tritium Science and Fabrication Facility (TSFF; TA-21-0209) and the Tritium Systems Test Assembly (TSTA; TA-21-0155), were put in Surveillance and Maintenance mode. In 2009, tritium operations were consolidated in WETF. DD&D of these facilities and remediation of the TA-21 site began in CY 2009 with demolition of both TSTA and TSFF completed in CY 2010.

WETF structures include TA-16-0205, -0329, -0450, -0824, and limited areas of TA-16-0202. The majority of tritium operations are conducted in TA-16-0205, with some assembly operations performed in TA-16-0202. TA-16-0450 is physically connected to TA16-0205 but radiologically separated and is not currently operational with tritium. TA-16-0329 and TA-16-0824 are office buildings. Limited operations involving the removal of tritium from actinide materials are conducted at LANL's TA-55 Plutonium Complex; however, these operations are small in scale and were not included as part of the Tritium Facilities in the SWEIS. The tritium emissions from TA-55, however, are included in the Plutonium Complex Key Facility.

WETF is listed as a HazCat 2 Nuclear Facility (Table 2-8). In CY 2010, the tritium inventory was greater than 30 grams.

Table 2-8. WETF Buildings with Nuclear Hazard Classification

Building	Description	2008 SWEIS	NHC LANL 2010[a]
TA-16-0205[b]	WETF	2	2
TA-16-0205A[b]	WETF	2	2
TA-16-0450[b]	WETF	2	2

[a] DOE List of Los Alamos National Laboratory Nuclear Facilities (DOE 2010a)

[b] In 2003, TA-16-205 and TA-16-0205A were nuclear facilities while TA-16-0450 was not operational with tritium. The three buildings are physically connected, but 16-0450 is radiologically separated from 16-0205/205A.

2.8.1 Construction and Modifications at the Tritium Facilities

The 2008 SWEIS projected one major facility modification to this Key Facility:

- DD&D of TA-21 tritium facilities was completed in CY 2010.

2.8.2 Operations at Tritium Facilities

The 2008 SWEIS identified nine capabilities for this Key Facility.

Operations in CY 2010 were within projections by the SWEIS, with WETF performing fewer than the projected 65 gas processing operations. Table A-15 lists the nine capabilities identified in the SWEIS and presents CY 2010 operational data for each of these capabilities. In addition to the capabilities listed in the SWEIS, other activities included disposition of legacy containers and shipment and receipt of bulk tritium.

2.8.3 Operations Data for Tritium Facilities

Data for operations at WETF were well below levels projected in the SWEIS. Operations data are summarized in Table A-16. Outfall 02A-129 is not active.

2.9 Target Fabrication Facility (TA-35)

The TFF is a two-story building (TA-35-0213) housing activities related to weapons production and laser fusion research. This Key Facility is categorized as a Low Hazard non-nuclear facility. The TFF laboratories and shops are specialized to provide precision machining, polymer science, physical and chemical vapor deposition, and target assembly.

The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a) identified one building within this Key Facility. Table 2-9 provides details.

Table 2-9. TFF Buildings Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2010*
TA-35-0213	TFF	RAD

* LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a)

2.9.1 Construction and Modifications at the Target Fabrication Facility

The 2008 SWEIS projected no major facility modifications to this Key Facility.

2.9.2 Operations at the Target Fabrication Facility

The 2008 SWEIS identified three capabilities for the TFF Key Facility. The primary measurement of activity for this facility is production of targets for research and testing (laser and physics testing).

The number of targets and specialized components fabricated for testing purposes was less than the 6,100 targets per year projected in the SWEIS. As seen in Table A-17, operations at the TFF were below levels projected in the SWEIS.

2.9.3 Operations Data for the Target Fabrication Facility

TFF activity levels are primarily determined by funding from fusion, energy, and other research-oriented programs, as well as funding from some defense-related programs. In CY 2010, operation levels were lower than those projected in the SWEIS. Table A-18 details operations data for CY 2010.

2.10 Bioscience Key Facility (TA-43, TA-03, TA-16, TA-35)

The Bioscience Key Facility definition includes the main Health Research Laboratory (HRL) facility (Buildings TA-43-0001, -0037, -0045, and -0020) plus additional offices and labs located at TA-35-0085, and -0254, and TA-03-0562 and -1076. Operations at TA-43 and TA-35-0085 include chemical and laser activities that maintain hazardous materials inventory and generate hazardous chemical wastes and very small amounts of LLW. Activities at TA-03-0562 have relatively minor impacts because of low numbers of personnel and limited quantities of materials. Bioscience research capabilities focus on the study of intact cells (conducted at Biosafety Levels 1 and 2 [BSL-1 and -2]), cellular components (e.g., RNA, DNA, and proteins), instrument analysis (e.g., DNA sequencing, flow cytometry, nuclear magnetic resonance spectroscopy, and mass spectroscopy), and cellular systems (e.g., repair, growth, and response to stressors). All Bioscience activities are categorized as Low Hazard non-nuclear within this Key Facility; there are no Moderate Hazard non-nuclear facilities or Nuclear Facilities (LANL 2007a). The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a) identified four buildings within this Key Facility. Table 2-10 provides details.

Table 2-10. Bioscience Buildings Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2010*
TA-43-0001	HRL	RAD
TA-43-0028	Storage	RAD
TA-43-0047	Storage	RAD
TA-43-0049	Storage	RAD

* LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a)

2.10.1 Construction and Modifications at the Bioscience Facilities

The 2008 SWEIS projected one construction or major modification to this Key Facility:

- Construct and operate Los Alamos Science Complex in TA-62

The Los Alamos Science Complex is proposed to be constructed at TA-62 on approximately 15 acres (LANL 2008b). It will consist of two buildings totaling 402,000 square feet and a 1,600-vehicle parking garage. DOE/NNSA cancelled the project in 2010.

During CY 2004, Bioscience finalized construction on the BSL-3 facility. The BSL-3 facility is a windowless single-story 3,202-square-foot, stand-alone, biocontainment facility located in TA-03, remote from the Los Alamos town site, east of Diamond Drive, and south of Sigma Road (south of MSL and Sigma Buildings). The building includes two BSL-3 and one BSL-2 laboratories plus associated administrative space, designed to safely handle and store biohazardous materials. The building has 100 percent redundancy for mechanical, electrical and plumbing systems and includes directional airflow and negative pressure from the areas of lesser to greater risk, plus door interlocks and high-efficiency particulate air (HEPA) filtration. A maximum of 16 workers would be in the facility at any given time.

Because of the building's small size and the small quantities of samples studied, there is no expected increase in quantities of sewage, solid wastes, or chemical wastes, nor increased demand for utilities. NEPA coverage for this project was initially provided by the *Environmental Assessment for the Proposed Construction and Operation of a Bio-Safety Level 3 Facility at Los Alamos National Laboratory* (DOE 2002c), dated February 26, 2002, and a FONSI (DOE 2002c). However, the FONSI for operations was withdrawn by

DOE/NNSA on January 22, 2004, due to the need to re-evaluate the environmental consequences of operating the facility with regard to its location on fill material and related seismic concerns. On November 29, 2005, DOE/NNSA issued an NOI to prepare an EIS for the proposed operation of the BSL-3 facility. Preparation of the EIS, however, has been completed, and it has not yet been released for public comment. The facility remains unused at this time, pending public review of the EIS and a Record of Decision.

2.10.2 Operations at Bioscience Facilities

The 2008 SWEIS identified 12 capabilities for this Key Facility (Table A-19). In CY 2010, some capabilities were expanded due to Work for Others/Non-Federal Entities proposals and new sponsor funding.

There is no radioactive work at HRL. This is attributed to technological advances and new methods of research, such as the use of laser-based instrumentation and chemiluminescence, which do not require the use of radioactive materials. For example, DNA sequencing predominantly uses laser analysis of fluorescent dyes adhering to DNA bases instead of radioactive techniques.

The HRL facility has BSL-1 and -2 work, which includes limited work with potentially infectious microbes. All activities involving infectious microorganisms are regulated by the Centers for Disease Control, National Institutes of Health, LANL’s Institutional Biosafety Committee, and the Institutional Biosafety Officer. BSL-2 work is expanding as part of LANL’s growing Chemical and Biological Nonproliferation Program.

The *In Vivo* Measurements Laboratory (IVML) and capability continue to be located in TA-43-0001. This is not a Bioscience Division capability; however, it is located at TA-43-0001 and therefore, it is a capability within this Key Facility and is included here. Effective July 15, 2010, LANL eliminated routine *in vivo* monitoring for plutonium. For many years, LANL has relied on its state-of-the-art urinalysis program to monitor for Pu-238 and Pu-239. This method is approximately 1000 times more sensitive than *in vivo* monitoring for plutonium, whose radiation is almost entirely blocked by body tissue. In the history of LANL, no plutonium intake has ever been identified by routine *in vivo* monitoring. LANL will continue to use routine *in vivo* counting to monitor for uranium, americium, fission products, and activation products. *In vivo* monitoring remains an effective technique for monitoring these radionuclides. It will also continue to use *in vivo* monitoring to supplement urinalysis following radiological incidents (special bioassay) when appropriate.

2.10.3 Operations Data for Bioscience Facilities

Table A-20 presents the operations data as measured by radioactive air emissions, NPDES discharges, and generated waste volumes. In CY 2010, operation levels were lower than those projected in the 2008 SWEIS with the exception of one. Chemical waste generation exceeded 2008 SWEIS projections due to the disposal of old roofing material from a re-roofing project at TA-43-0001.

2.11 Radiochemistry Facility (TA-48, TA-46)

The Radiochemistry Key Facility includes all of TA-48 (116 acres) and part of TA-46. It is a research facility that fills three roles: research, production of medical radioisotopes, and support services to other LANL organizations, primarily through radiological and chemical analyses of samples. TA-48 contains six major research buildings: the Radiochemistry Laboratory (Building TA-48-0001), the Assembly and Checkout Building (TA-48-0017), the Advanced Analytical Development Building (TA-48-0028), the Clean Chemistry/Mass Spectrometry Building (TA-48-0045), the Weapons Analytical Chemistry Facility (48-0107), and the Isotope Separator Building (TA-48-0008).

The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a) identified 25 buildings within this Key Facility. Table 2-11 provides details.

Table 2-11. Radiochemistry Buildings Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2010*
TA-48-0001	Radiochemistry Laboratory	RAD
TA-48-0008	Isotope Separator Building	RAD
TA-48-0017	Assembly and Checkout Building	RAD
TA-48-0026	Office Building	RAD
TA-48-0027	Transportable	RAD
TA-48-0028	Advanced Analytical Development Building	RAD
TA-48-0033	Transportable	RAD
TA-48-0038	Metal Building	RAD
TA-48-0039	Metal Building	RAD
TA-48-0045	Clean Chemistry/Mass Spectrometry Building	RAD
TA-48-0063	Transportainer	RAD
TA-48-0107	Weapons Analytical Chemistry Facility	RAD
TA-48-0111	Transportainer	RAD
TA-48-0168	Chemical/Storage Building	RAD
TA-48-0180	Chemical/Storage Building	RAD
TA-48-0181	Chemical/Storage Building	RAD

Building	Description	LANL 2010*
TA-48-0215	Transportainer	RAD
TA-48-0236	Walk-in Cooler	RAD
TA-46-0024	Laboratory/Office	RAD
TA-46-0031	Test Building #2	RAD
TA-46-0041	Laser Isotope Support Facility	RAD
TA-46-0154	Physical Chemistry Lab	RAD
TA-46-0158	Laser Induced Chemistry Lab	RAD
TA-46-0208	FEL Lab Building	RAD
TA-46-0416	Morgan Shed	RAD

* LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a)

2.11.1 Construction and Modifications at the Radiochemistry Facility

The 2008 SWEIS projected no major facility modifications to this Key Facility. In 2010, there was a significant upgrade to the heating, ventilation, and air conditioning (HVAC) system in the hot-cells wing area (area that produces medical radioisotopes and processes radioactive materials) of TA-48-0001, and in 2011, a study will be launched to evaluate potential segmentation of the hot-cells wing area.

2.11.2 Operations at the Radiochemistry Facility

The 2008 SWEIS identified 11 capabilities for the Radiochemistry Key Facility. As seen in Table A-21, four of the 11 capabilities were at higher levels than projected in the SWEIS: Radionuclide Transport Studies, Isotope Production, Actinide and Transuranic (TRU) Chemistry, and Sample Counting. The remaining seven capabilities were below levels projected in the SWEIS.

2.11.3 Operations Data for the Radiochemistry Facility

In CY 2010, some operations within this Key Facility increased. However, the operation data levels were below those projected in the 2008 SWEIS. Table A-22 provides details.

2.12 Radioactive Liquid Waste Treatment Facility (TA-50)

The RLWTF is located at TA-50 and consists of the treatment facility (Building TA-50-0001), support buildings, and liquid and chemical storage tanks. The primary activity is treatment of radioactive liquid wastes generated at other LANL facilities. The facility also houses analytical laboratories to support these treatment operations.

This Key Facility is a HazCat 3 Nuclear Facility and includes the following structures: the RLWTF itself (Building TA-50-0001), influent tanks and pumping station (TA-50-0002), the acid and caustic waste storage tank vault (TA-50-0066), a 100,000-gallon influent storage tank (TA-50-0090), and a building that houses evaporator storage tanks (TA-50-0248) (Table 2-12).

Table 2-12. Radioactive Liquid Waste Treatment Facility Buildings with Nuclear Hazard Classification

Building	Description	2008 SWEIS	NHC LANL 2010*
TA-50-0001	Main Treatment Plant	3	3
TA-50-0002	Influent tanks and pumps	3	3
TA-50-0066	Acid and Caustic Waste Tanks	3	3
TA-50-0090	Holding Tank	3	3
TA-50-0248	Evaporator Storage Tanks	3	3

* DOE List of Los Alamos National Laboratory Nuclear Facilities (DOE 2010a)

2.12.1 Construction and Modifications at the Radioactive Liquid Waste Treatment Facility

The 2008 SWEIS projected two modifications to this Key Facility:

- Construct and operate a replacement for the existing RLWTF at TA-50
- Construct and operate evaporation tanks in TA-52

Construction of a replacement RLWTF was placed on hold by the DOE in July 2010 in order to re-evaluate design bases and final facility configuration. Decisions were not reached during 2010. The design of evaporation tanks at TA-52 was also interrupted.

However, a new facility, the Waste Management and Risk Mitigation Facility (WMRM; TA-50-0250) was placed into service in April 2010. The project was initiated in 2000 after the Cerro Grande Fire. Low-level influent continued to be generated during the fire, and RLWTF personnel were required to treat water even though LANL had been shut down and County residents evacuated. Since the Jemez Mountains experience a major wildfire once per decade, it seemed prudent to install emergency influent storage capacity.

WMRM is a steel-frame structure designed to meet Performance Category 2 (PC-2) design requirements for seismic, wind, and snow loads. It houses six storage tanks, each capable of holding 50,000 gallons of water, in a below-grade concrete vault. The floor of the vault is 26 feet below grade to allow for gravity drainage of low-level radioactive liquid waste (RLW) into the tanks. The reinforced-concrete vault also serves as the facility structural foundation. WMRM is a radiological facility, limited to 0.52 americium-equivalent curies of radioactivity.

2.12.2 Operations at the Radioactive Liquid Waste Treatment Facility

The 2008 SWEIS projected two capabilities for this Key Facility (Table A-23).

The primary measurement of activity for this facility is the volume of radioactive liquid processed through the main treatment plant. In CY 2010, a total of 3.1 million liters of treated water were discharged to the environment. However, because of changes to US Environmental Protection Agency (EPA) discharge standards, much of this treated water was not discharged to Mortandad Canyon.

EPA standards for the discharge of treated water to Mortandad Canyon from the TA-50 RLWTF became more restrictive effective August 1, 2010. Specifically, standards for copper and zinc were decreased to levels more than 2,000 times lower than EPA's drinking water standards (EPA 2007).

The revised discharge standards for copper and zinc had major impacts at the RLWTF. Research and testing of potential treatment technologies began in 2007. Design and installation of new, full-scale treatment equipment using ion exchange started in 2009. Changes to laboratory and production protocols proved necessary, the result of learning that high-purity water (used in the laboratory) and high-purity chemicals (used to adjust the pH of treated water) contained copper and zinc in excess of the standards. It was also necessary to purchase a new mass spectrometer to enable analysis at the required extremely low levels.

Despite these efforts, the new discharge standards could not consistently be met. Alternative strategies for the discharge of treated water were, therefore, developed. Two of these were implemented during 2010: the use of the TA-50 cooling towers to evaporate treated water and the trucking of treated water to TA-53 evaporation basins (LANL 2011a).

The evaporation of treated water was a change from the prior practice of discharging treated water through an outfall into Mortandad Canyon. Canyon discharges had been the almost-exclusive discharge path since the RLWTF began operations in 1963. Discharges during 2010 were as follows:

- 2.16 million liters to Mortandad Canyon
- 0.16 million liters evaporated via cooling towers at the RLWTF
- 0.77 million liters trucked to the TA-53 evaporation tanks.

Another highlight during CY 2010 was the resumption of transuranic RLW treatment. A long shutdown to replace deteriorating equipment and piping was ended when the DOE/NNSA authorized the restart of TA-50-0001, Room 60 treatment operations (DOE 2009c). The resumption of transuranic RLW treatment led to a productive 2010, which included the following highlights:

- January 2010: First treatment of transuranic RLW since August 2006

- February 2010: First drum tumbling in more than six years
- April 2010: First shipment of transuranic sludge in 6.5 years

By the end of the year, influent storage tanks for transuranic RLW were emptied, as was the former, corroded sludge storage tank. These accomplishments required the treatment of more than 15,000 liters of acid waste and 8,000 liters of caustic waste. In addition, waste cleanout campaigns for sludge were conducted in February, August, September, and November 2010.

A campaign to treat and dispose of evaporator bottoms (residual actinides and impurities resulting from contaminated effluents filtered through an evaporator) was also successfully conducted in 2010. The campaign culminated in 23 tanker shipments with a total of 103,000 gallons of evaporator bottoms. This was the first treatment of evaporator bottoms since February 2005, a result of budgetary restrictions. The campaign emptied the 100,000-gallon influent storage tank, thereby making the tank available for its intended purpose. This bottoms campaign also had a significant change from past practices. A DOE 435.1 exemption was received to dispose of the wastes at a non-DOE site in Clive, Utah. Consequently, solidified bottoms were not returned for disposal at Area G.

2.12.3 Operations Data for the Radioactive Liquid Waste Treatment Facility

In CY 2010, operations data levels were below those projected in the SWEIS with one exception. Shipment of evaporator bottoms exceeded SWEIS projections for LLW. Shipments during 2010 consisted of a five-year backlog of evaporator bottoms. Table A-24 provides details.

2.13 Los Alamos Neutron Science Center (TA-53)

The LANSCE Key Facility lies entirely within TA-53. The facility has more than 400 buildings, including one of the largest buildings at LANL. Building TA-53-0003, which houses the linear accelerator (linac), is 315,000 square feet. Activities consist of neutron science and nuclear physics research, proton radiography, the development of accelerators and diagnostic instruments, and production of medical radioisotopes. The majority of the LANSCE Key Facility (the User Facility) is composed of the 800-million-electron-volt linac, a Proton Storage Ring, and three major experimental areas: the Manuel Lujan Neutron Scattering Center, the Weapons Neutron Research (WNR) facility, and Experimental Areas B and C. In addition, the Isotope Production Facility (IPF) completed its sixth full run cycle in 2010.

Experimental Area C is the location of proton radiography experiments for the Science-Based Stockpile Stewardship Program. A new experimental facility for the production of ultracold neutrons was commissioned in 2005 in Area B and has completed its sixth full run cycle (DOE 2002d). Experimental Area A, formerly used for materials irradiation experiments and isotope production, is currently inactive and was emptied of all beam and experimental equipment in 2009. Future programmatic use of Experimental Area A is slated for installation of the Materials Test Station (MTS). A second accelerator facility located at TA-53-0365, the Low-Energy Demonstration Accelerator, was decommissioned and dismantled in 2006. TA-53-0365 is currently being used for buildup of a Free Electron Laser prototype.

The 1999 SWEIS identified two HazCat 3 nuclear facilities (Buildings 53-0007 and 53-0030). In September 2006, the DOE concurred with LANSCE's request to be considered as an accelerator facility regulated under DOE Order 420.2B, and all facilities at TA-53 were removed from the nuclear hazard facility list in CY 2007. LANSCE is classified as an Accelerator Facility and currently operates under two main safety basis documents. Document one is the LANSCE Safety Assessment Document (SAD), which has seven volumes that describe the accelerator and the experimental areas. The SAD volumes are as follows: Volume I—LINAC, Volume II—Isotope Production Facility, Volume III—Experimental Area C, Volume IV—Experimental Area B, Volume V—Experimental Area A, Volume VI—Lujan Center, Volume VII—Weapons Neutron Research Facility. The second safety basis document is the LANSCE Accelerator Safety Envelope, which provides the operating bounds for the seven areas discussed in SAD Volumes I–VII.

The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a) identified two buildings within this Key Facility. The two structures in Table 2-13 make up the TA-53 RLWTF that is managed and operated by TA-55 Radioactive Liquid Waste personnel.

Table 2-13. LANSCE Buildings Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2010*
TA-53-0945	Liquid Waste Treatment Facility	RAD
TA-53-0954	Rad Liquid Waste Basins	RAD

* LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a)

2.13.1 Construction and Modifications at the Los Alamos Neutron Science Center

The 2008 SWEIS projected two modifications to LANSCE:

- Installation of MTS equipment in Experimental Area A
- Construct Neutron Spectroscopy Facility within existing buildings (under High-Powered Microwaves and Advanced Accelerators capability)

In 2008, execution of the MTS began (LANL 2008c). In 2009, restoration of TA-53-0003 Area A in preparation for MTS programmatic installation was completed including removal of experimental equipment, beam line components, and hundreds of tons of shielding blocks. In addition to the projected facility modifications reflected in the 2008 SWEIS, additional construction and modification projects were initiated and/or completed in 2010. MTS was granted Critical Decision (CD)-0 project status and expects to receive CD-1 project status in 2011. Other significant projects include design and procurement of the WNR experimental area substation switchgear that will provide a feed of secondary electrical loads for several experimental buildings in the southeastern portion of the accelerator facility (LANL 2010a). This new substation will also accommodate future secondary loads for LANSCE user facilities such as the 3,650 square-foot new user facility associated with WNR National Security Nuclear Science (NS2) approved for design in 2010 (LANL 2010b). The Lujan Center user facility was also approved for design and installation of a new HVAC system for Building 30 and this phased project will continue over the next several years and will include electrical upgrades (LANL 2010c). The planning, design, and procurement of long lead components for a multiyear project entitled "LANSCE Risk Mitigation" was approved in 2010 where the scope of this project encompasses the restoration of the LANSCE 800-MeV linear accelerator back to historic performance levels (DOE 2010b). An outfall compliance project was planned in 2010 to install chlorine monitoring loops at the LANSCE accelerator cooling towers in an effort to closely control chlorine within the tower basins and chlorine released into the federally permitted outfall. Electrical breaker maintenance was performed on all of the major facilities at LANSCE. Work on all of the projects listed above will continue into 2011.

Other LANSCE projects that were planned and fully executed in 2010 include milling and repaving of identified roadways at LANSCE (LANL 2010d), space reduction to include salvaging/destruction of four transportables (LANL 2010e), and execution of a investigation and sampling plan for Lower Sandia Canyon Aggregate Area for potential closure of areas of concern (LANL 2010f).

2.13.2 Operations at the Los Alamos Neutron Science Center

The 2008 SWEIS identified eight capabilities for this Key Facility (Table A-25).

During CY 2010, LANSCE operated the accelerator and four of the five experimental areas. Area A has been idle for more than nine years. The primary indicator of activity for the LANSCE facility is production of the 800-million-electron-volt LANSCE proton beam as shown in Table A-25. These production figures are all less than the 6,400 hours at 1,250 microamps projected in the SWEIS. There were no experiments conducted for transmutation of wastes.

The most significant accomplishment in CY 2010 for LANSCE was the successful completion of the run cycle for the three primary experimental facilities: the WNR, the Proton Radiography area, and the Manuel Lujan Center. LANSCE hosted over 908 user visits during the eight-month 2010 run cycle. The facility operated at an average of 84.6 percent availability for the Lujan Center and 87.5 percent for WNR, allowing the completion of 389 experiments for internal and external neutron scattering and neutron nuclear physics users. Another significant accomplishment was the forth production run for the ultracold neutron experimental area.

Operations for LANSCE were below 2008 SWEIS projections except for in one capability, Radioactive Liquid Waste Treatment (Solar Evaporation at TA-53). Radioactive liquid waste treatment exceeded 2008 SWEIS projections due to the large contributions of radioactive liquid waste received from RLWTF and the TA-21 remediation work.

2.13.3 Operations Data for the Los Alamos Neutron Science Center

In CY 2010, routine waste generation and NPDES discharge volumes were below projected quantities. Radioactive air emissions are a key parameter since LANSCE emissions have historically accounted for more than 95 percent of the total LANL off-site dose. The total point source emissions were approximately 249 curies, which represents a 98 percent decrease from 2005. As in recent years, the Area A beam stop did not operate during 2010; however, operations in Line D resulted in the majority of emissions reported for 2010. Table A-26 provides details of LANSCE operations.

2.14 Solid Radioactive and Chemical Waste Facilities (TA-50 and TA-54)

The SRCW Key Facility is located at TA-50 and TA-54. Activities are all related to the management (packaging, characterization, receipt, transport, storage, and disposal) of radioactive and chemical wastes generated at LANL.

It is important to note that LANL's waste management operation captures and tracks data for waste streams (whether or not they go through the SRCW facilities), regardless of their points of generation or disposal. This includes information on the waste generating process; quantity; chemical and physical characteristics of the waste; regulatory status of the waste; applicable treatment and disposal standards; and the final disposition of the waste. The data are ultimately used to assess operational efficiency, help ensure environmental protection, and demonstrate regulatory compliance.

As shown in Table 2-14, the 2008 SWEIS recognized 24 structures as having HazCat 2 nuclear classification (Area G was recognized as a whole and then individual buildings and structures were also recognized).

Table 2-14. Solid Waste Buildings with Nuclear Hazard Classification

Building	Description	2008 SWEIS	NHC LANL 2010[a]
TA-50-0069	WCRR Facility Building	2	2
TA-50-0069 Outside	Nondestructive Analysis Mobile Activities	N/A	2
TA-50-0069 Outside[b]	Drum Storage	2	2
TA-54-Area G[c]	LLW Storage/Disposal	2	2
TA-54-0002	TRU Storage Building	N/A	2
TA-54-0008	Storage Building	2	2
TA-54-0033	TRU Drum Preparation	2	2
TA-54-0038	Radioassay and Nondestructive Testing Facility	2	2
TA-54-0048	TRU Waste Management Dome	2	2
TA-54-0049	TRU Waste Management Dome	2	2
TA-54-0153	TRU Waste Management Dome	2	2
TA-54-0224	Mixed Waste Storage Dome	N/A	2
TA-54-0226	TRU Waste Management Dome	2	2
TA-54-0229	TRU Waste Management Dome	2	2
TA-54-0230	TRU Waste Management Dome	2	2
TA-54-0231	TRU Waste Management Dome	2	2
TA-54-0232	TRU Waste Management Dome	2	2
TA-54-0283	TRU Waste Management Dome	2	2
TA-54-0375	TRU Waste Management Dome	2	2
TA-54-1027	Hazardous, Chemical, Mixed, and Tritiated Waste Storage Dome	N/A	2
TA-54-1028	Hazardous, Chemical, Mixed, and Tritiated Waste Storage Dome	N/A	2
TA-54-1030	Hazardous, Chemical, Mixed, and Tritiated Waste Storage Dome	N/A	2
TA-54-1041	Hazardous, Chemical, Mixed, and Tritiated Waste Storage Dome	N/A	2
TA-54-Pad10[d]	Storage Pad	2	2

a DOE list of Los Alamos National Laboratory Nuclear Facilities (DOE 2010a).
b "Drum Storage" includes drum staging/storage pad and waste container temperature equilibration activities outside TA-50-69.
c This includes LLW (including mixed waste) storage and disposal in domes, pits, shafts, and trenches; TRU waste storage in domes and shafts (does not include TRU Waste Inspection and Storage Program); TRU legacy waste in pits and shafts; low-level disposal of asbestos in pits and shafts. Operations building: TRU waste storage.
d Pad 10 was originally designated as Pads 2 and 4 in the SWEIS.

2.14.1 Construction and Modifications at the Solid Radioactive and Chemical Waste Facility

The 2008 SWEIS projected one major modification to this Key Facility:

- Plan, design, construct, and operate waste management facilities transition projects to facilitate actions required by the NMED Compliance Order on Consent (Consent Order)

These projects will replace LANL's existing facilities for solid waste management. The existing facilities at TA-54 are scheduled for closure and remediation under the Consent Order.

The Offsite Source Recovery Project (OSRP) recovers and manages unwanted radioactive sealed sources and other radioactive material that

- Present a risk to public health and safety;
- Present a potential loss of control by a US Nuclear Regulatory Commission or agreement state licensee;
- Are excess and unwanted and are a DOE responsibility under Public Law 99-240[2] (42 USC); or
- Are DOE-owned.

The project is sponsored by DOE's Office of Technical Program Integration and the Albuquerque Operations Office Waste Management Division that operates from LANL and focuses on the problem of sources and devices held under US Nuclear Regulatory Commission or state licenses for which there is no disposal option. The project was reorganized in 1999 to more aggressively recover and manage the estimated 18,000 sealed sources that will become excess and unwanted over the next decade. This reorganization combined three activities: the Radioactive Source Recovery Program, the Offsite Waste Program, and the Plutonium-239/Beryllium Neutron Source Project. As of February 2008, about 15,300 sources had been brought to LANL. Of these, about 3,500 were sent off site for disposition (DOE 2008a). Approximately 434 sources were collected for storage at TA-54 during CY 2010. Eventually, these sources will be shipped to the Waste Isolation Pilot Plant (WIPP) for final disposition. The OSRP received NEPA coverage under an environmental assessment and subsequent FONSI (DOE 1995), Accession Numbers 6279 (DOE 1996g), 7405 (DOE 1999c), and 7570 (DOE 1999d), the 1999 SWEIS (DOE 1999a), and the 2008 SWEIS (DOE 2008a).

2.14.2 Operations at the Solid Radioactive and Chemical Waste Facility

The primary measurements of activity for this facility are volumes of newly generated chemical, low-level, and TRU wastes to be managed and volumes of legacy TRU waste

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[2] Public Law 99-240: an act to amend the Low-Level Radioactive Waste Policy Amendments Act of 1985. Introduced in the Senate and House of Representatives of the United States of America in Congress assembled, Ninety-Ninth Congress, January 15, 1986. The Policy Act was designed to stimulate development of new facilities by encouraging states to form interstate compacts for disposal on a regional basis.

and mixed low-level radioactive waste (MLLW) in storage. Chemical and radioactive waste management activities were at levels below those projected in the SWEIS at this Key Facility. These and other operational details are in Table A-27.

2.14.3 Operations Data for the Solid Radioactive and Chemical Waste Facility

Levels of activity in CY 2010 were less than projected in the SWEIS, except for in one case. Chemical waste generation exceeded 2008 SWEIS projections due to the disposal of 1,380 kg of soil/asphalt that resulted from a repaving project, and 1,248 kg of latex paint. Table A-28 provides details.

2.15 Plutonium Facility Complex (TA-55)

The Plutonium Facility Complex consists of six primary buildings and a number of support, storage, security, and training structures located throughout TA-55. The Plutonium Facility, Building 55-0004, is categorized as a HazCat 2 Nuclear Facility, but was built to comply with the seismic standards for HazCat 1 Nuclear Faciltiy. In addition, TA-55 includes two low hazard chemical facilities (Buildings 55-0003 and 55-0005) and one low hazard energy source facility (55-0007). The DOE/NNSA listing of LANL nuclear facilities for 2010 (DOE 2010a) retained Building TA-55-0004 as a HazCat 2 Nuclear Facility (Table 2-15).

Table 2-15. Plutonium Complex Buildings with Nuclear Hazard Classification

Building	Description	2008 SWEIS	NHC LANL 2010*
TA-55-0004	Plutonium Processing	2	2

* DOE List of Los Alamos National Laboratory Nuclear Facilities (DOE 2010a)

The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a) identified three buildings within this Key Facility. Table 2-16 provides details.

Table 2-16. Plutonium Facility Identified as Less-than-HazCat-3 Nuclear Facility

Building	Description	LANL 2010*
TA-50-0037	Actinide Research and Technology Instruction Center (ARTIC)	RAD
TA-55-0185	Drum Storage Building	RAD
TA-55-0355	Safe, Secure Trailer (SST) Facility	RAD

* LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a)

2.15.1 Construction and Modifications at the Plutonium Complex

The 2008 SWEIS projected two facility modifications:

- TA-55 Reinvestment Project (TRP) (formerly the Plutonium Facility Complex Refurbishment Project):
  - The TRP consists of three line items (TRP I, TRP II, and TRP III). Each line item was split into subprojects. TRP I included the repair and replacement of mission-critical cooling system components for buildings in TA-55 to allow these facilities to continue to operate and for DOE/NNSA to install a new cooling system that meets current standards regarding phase-out of Class 1 ozone-depleting substances. TRP I construction activities were completed in CY 2010. TRP II and TRP III were in the planning stages during CY 2010.
- TA-55 Radiography Facility Project:
  - TA-55 Radiography/Interim (LANL 2001c). Completed in 2008. TA-55 Radiography, complements TA-55 Radiography/Interim, remained on hold in CY 2010 due to funding.

In addition, the following construction/modification projects continued in 2010:

- CMRR NF Project DOE Pre-conceptual Design (LANL 2001a), ongoing in CY 2010.[3] In 2007 construction of the RLUOB began. Construction was ongoing in 2010. Beneficial occupancy is expected in 2011.
- Decontamination and decommissioning (D&D) and upgrades of equipment were initiated in order to upgrade small sample fabrication with a new machining line for plutonium samples. This upgrade work continued through 2010.
- Nuclear Materials Safeguards and Security Upgrades Project (NMSSUP) Phase II. The project provides physical security upgrades at the Plutonium Facility Complex. NMSSUP Phase II construction activities continued through 2010.

2.15.2 Operations at the Plutonium Complex

TA-55, located just southeast of TA-3, includes the Plutonium Facility Complex and is the chosen location for the CMRR NF. This facility replaces the current CMR facility and provides chemical and metallurgical processes for recovering, purifying, and converting plutonium and other actinides into many compounds and forms. Additional capabilities include the means to ship, receive, handle, and store nuclear materials, as well as to manage the wastes and residues produced by TA-55 operations. Relocated chemistry and metallurgy research, actinide chemistry, and materials characterization capabilities that may be provided at the site through the project are in the pre-conceptual phase of construction.

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3 The CMRR Project was covered by an environmental impact statement (DOE 2003a).

The 2008 SWEIS identified seven capabilities for this Key Facility (Table A-29). In CY 2010, all seven capabilities activity levels were below those projected in the SWEIS.

2.15.3 Operations Data for the Plutonium Complex

Operations data at this Key Facility remained below levels projected in the SWEIS, except in two cases: MLLW and chemical Waste. The Plutonium Complex Facility exceeded MLLW waste projections due to an old glovebox that no longer met the mission needs or specifications and was therefore D&Ded (there will be more gloveboxes being disposed for the same reason in the future). The Plutonium Complex Facility exceeded chemical waste projections due to a molecular sieve desiccant that had been stored in TA- 55-0268 for an extended period of time. This building is not environmentally controlled, (e.g. humidity and temperature, to store the dessicant) and the desiccant no longer met the mission specification. Therefore it was disposed of. Details of the Plutonium Facility Complex operational data are presented in Table A-30.

2.16 Non-Key Facilities

The balance, and majority, of LANL buildings are referred to in the SWEIS as Non-Key Facilities. Non-Key Facilities house operations that do not have potential to cause significant environmental impacts. These buildings and structures are located in 30 of LANL's 49 TAs and comprise approximately 14,224 of LANL's 26,058 acres. Table 2-17 shows the LANL Nuclear Hazard Classification List for the Non-Key Facilities.

Table 2-17. Non-Key Facilities with Nuclear Hazard Classification

Building	Description	2008 SWEIS	NHC LANL 2010*
TA-03-0040	Physics Building	3	N/A
TA-03-0065	Source Storage	2	N/A
TA-03-0130	Calibration Building	3	N/A
TA-10 potential release site (PRS) 10-002(a)-00	Former Liquid Disposal Complex	3	3

* DOE List of Los Alamos National Laboratory Nuclear Facilities (DOE 2010a)

The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a) identified 26 buildings within this Non-Key Facility as Less than Haz Cat 3. Table 2-18 provides details.

Table 2-18. Non-Key Facilities with Radiological Hazard Classification

Building	Description	LANL 2010*
TA-03-0016	Ion Beam Facility	RAD
TA-03-0034	Cryogenics Bldg. B	RAD
TA-03-0040	Physics Bldg., office and lab	RAD
TA-03-0169	Warehouse	RAD
TA-03-0215	Physics Analytical Center	RAD
TA-03-0216	Weapons Test Facility	RAD
TA-03-0217		RAD
TA-03-0494	Geochemical Analytical Facility	RAD
TA-03-1819	Experiment Material Lab	RAD
TA-03-2002	X-Ray Machine Lab	RAD
TA-03-2322	NISC	RAD
TA-21-0257	Manhole Station	RAD
TA-33-0086	High Pressure Tritium	RAD
TA-35-0002	Nuclear Safeguards Research	RAD
TA-35-0027	Nuclear Safeguards Lab	RAD
TA-35-0034	Nuclear Safeguards Research Bldg.	RAD
TA-35-0087	Laboratory and offices	RAD
TA-35-0124	Antares Target Hall	RAD
TA-35-0125	Atlas Bldg.	RAD
TA-35-0126	Mechanical Bldg.	RAD
TA-35-0189	Trident Laser Lab	RAD
TA-35-0374	Morgan Shed	RAD
TA-36-0001	Laboratory and offices	RAD
TA-36-0214	Central HP Calibration Facility	RAD
TA-41-0001	Underground Vault	RAD
TA-41-0004	Laboratory	RAD

* LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009a)

2.16.1 Construction and Modifications at the Non-Key Facilities

The 2008 SWEIS projected no major modifications to the Non-Key Facilities under the No Action Alternative.

Protective Force Running Track

Description. A regulation four-lane, 400-meter running track was installed at TA-58 beginning in 2009. This track was installed to provide the Laboratory's protective force the capabilities to meet and maintain the demanding fitness standards required by federal regulations. It is sited on approximately 4.4 acres in an area previously used for outdoor fitness training. Utilities were not required for this project.

Status. The project received NEPA coverage through the 2008 SWEIS (DOE 2008a). Construction began in August 2009 and was completed in August 2010.

Tactical Training Facility

Description. The Tactical Training Facility, a mock facility commonly referred to as a Military Operations in Urban Terrain (MOUT) Facility, was installed at TA-16 beginning in 2010. The facility is designed to allow for interior and exterior feature reconfiguration to simulate both indoor and outdoor physical configurations of certain LANL facilities where tactical training is needed. In addition to modular configurable spaces, the facility will also house a supervisor viewing area, stairwells to accommodate move and shoot training based on local facilities of concern, a simulated Central Alarm Station (CAS), simulated Technical Area Isolation Zone (TAIZ) monitored by the CAS that is inside the building, a briefing room, firearms storage area (vault type room), and restroom facilities. This building is planned to be a pre-manufactured steel building with a slab on grade foundation, modeled after the Oak Ridge Y-12 Dye Marking Cartridge (DMC) facility currently in use. It is sited on approximately 13.44 acres.

Status. The project received NEPA coverage through the 2008 SWEIS (DOE 2008a). Construction began in August 2010 and is expected to be complete in December 2011.

Photovoltaic Array Reuse of Los Alamos County Landfill Location

Description. In an effort to beneficially reuse the LANL TA-61 "brownfield" landfill site, Los Alamos County proposed to lease and use approximately 15 acres of the 46 acres of land it operated as a landfill for the installation of up to 2.5 MW of photovoltaics (PV) to generate electric power. The system will be connected to a 7-MWHr battery storage system, which in turn will be connected to the Los Alamos Power Pool infrastructure.

Status. In February 2010, DOE/NNSA categorically excluded the project (DOE 2010c). The first MW and battery of the PV system is being installed by Los Alamos County, and construction is expected to start in March 2012. The other 1 to 1.5 MW will be installed through a Los Alamos County-issued power purchase agreement. The entire system is expected to be in place and operating no later than the summer of 2013.

Expansion of the Sanitary Effluent Reclamation Facility

Description. Early in 2010, NNSA proposed an action that would expand the size and operational capacity of the SERF, located on the south rim of Sandia Canyon. The purpose of this expansion is to improve wastewater treatment to meet effluent limitations for polychlorinated biphenyls (PCBs) imposed in NPDES Permit NM0028355. The permit requires compliance with these limitations by July 30, 2012. This SERF Expansion project includes the installation of associated storage tanks, pumps, piping, and equipment necessary to distribute the treated water for reuse at

LANL facilities. Depending on the amount of treated water ultimately reused, this action could reduce or eliminate the amount of wastewater currently discharged into the upper portion of Sandia Canyon.

Status. The SERF Expansion received NEPA coverage through a FONSI on August 24, 2010 (DOE 2010d). The project achieved CD-1 in early 2010 and expects to achieve CD-2, Approve Performance Baseline, CD-3, and start of construction by May 2011. Operations should restart at the facility in September 2011, and the project plans to be operational by July 30, 2012 consistent with the permit requirements.

2.16.2 Operations at the Non-Key Facilities

Non-Key Facilities are host to seven of the eight categories of activities at LANL (DOE 2008a) as shown in Table A-31. The eighth category, environmental cleanup, is discussed in Section 2.17. During CY 2010, no new capabilities were added to the Non-Key Facilities, and none of the eight existing capabilities was deleted.

2.16.3 Operations Data for the Non-Key Facilities

The Non-Key Facilities occupy more than half of LANL. In 2010, the Non-Key Facilities generated about 30 percent of the total LANL chemical waste volume; less than one eighth percent of the total LLW volume; about 63 percent of the MLLW volume; and about six percent of the total TRU waste volume. Operations data at the Non-Key Facilities remained below levels projected in the SWEIS, except in two cases: MLLW and chemical waste. Chemical Waste generation exceeded the SWEIS projections due primarily to the start of the DD&D of the former Administration Building (TA-03-0043). Non-Key Facilities exceeded the SWEIS projections for MLLW due to a legacy waste clean-out in order for the Facilities Operations Director to bring TA-03-0043 into compliance and a "cold and dark" (pre-D&D) status. Table A-32 presents details of the operations data from CY 2010.

The combined flows of the SWWS and the TA-03 Steam Plant account for about 91 percent of the total discharge from Non-Key Facilities and about 67 percent of all water discharged by LANL. Section 3.2 provides more details.

2.17 Environmental Cleanup

The Laboratory through the EP Directorate performs cleanup of sites and facilities formerly involved in weapons research and development.

The EP Directorate includes the operations and responsibilities of the previous Environmental Restoration (ER) Project, which generates a significant amount of waste during characterization and remediation activities; therefore, the EP cleanup programs are included as a section in Chapter 2. The 2008 SWEIS projected that implementation of the Consent Order would contribute 80 percent chemical waste, 65 percent LLW, 97 percent MLLW, and 44 percent TRU and mixed TRU waste at the Laboratory. For further details on waste generation amounts, see section 3.3.

2.17.1 History of Corrective Action Sites at LANL

The DOE established the ER Project in 1989 to characterize and, if necessary, remediate Solid Waste Management Unit (SWMU)s and Areas of Concern (AOCs) known or suspected to be contaminated from historical Laboratory operations. Many of the SWMUs and AOCs are located on DOE/NNSA property and some properties containing SWMUs and AOCs have been conveyed to Los Alamos County or to private ownership (within Los Alamos town site). Characterization and remediation efforts are regulated by the NMED for chemical constituents, by the New Mexico Solid Waste Act (NMSA 1978, §74-9-36[D]) and by DOE/NNSA for radionuclides under the Atomic Energy Act implemented through DOE Order 5400.5, "Radiation Protection of the Public and the Environment," and DOE Order 435.1, "Radioactive Waste Management."

The Consent Order provides that the status of all 1,446 corrective action sites (those requiring corrective action and those with completed corrective actions) will be tracked in LANL's Hazardous Waste Facility Permit.

Since the start of the Consent Order through the end of CY 2010, NMED issued 54 Certificates of Completion without Controls and 26 Certificates of Completion with Controls. Of the 80 Certificates of Completion issued, four overlapped former EPA approvals for "no further action" (NFA) and one overlapped NMED removals from Module VIII of LANL's Hazardous Waste Facility Permit; thus, only 75 are subtracted. This administrative action reduced the total number of corrective action sites remaining in the investigation process at LANL to 1,346.

In 2010, two previously unknown corrective action sites were identified and reported to the administrative authority and the Laboratory received its new Hazardous Waste Facility Permit, which removed 20 RCRA sites as corrective action sites. Combined, these administrative actions reduced the total number of corrective action sites remaining in the investigation process at LANL to 1,328.

In Table IV-2 of the Consent Order, 45 sites within Testing Hazard Zones are deferred for investigation and corrective action until the firing site used to delineate the relevant Testing Hazard Zone is closed or inactive and the DOE determines that it is not reasonably likely to be reactivated. NMED has also approved delayed corrective action: at 28 sites where investigation is not feasible until future DD&D of associated operational facilities, at five sites that are currently active units, and at four sites until operations cease at nearby non-deferred firing sites. It is expected that corrective actions for both the deferred and the delayed sites will ultimately be implemented under LANL's Hazardous Waste Facility Permit, as facility closure is not likely to occur prior to the end date of the Consent Order (currently 2015).

2.17.2 Environmental Cleanup Operations

Corrective actions are complete at a site when LANL has demonstrated and documented to the regulatory authority that the site poses no unacceptable risk or dose to humans and ecological resources, such as plants and animals. The determination of no unacceptable risk or dose is based upon the comparison of the analytical data gathered from investigation sampling at each site to the risk-based screening levels derived by EPA, NMED, or LANL. When the risks and doses are less than the regulatory authority's target levels, the site is determined to pose no unacceptable risk or dose to a human and/or ecological receptor.

The projects wrote and/or revised 22 work plans and 37 reports and submitted them to NMED during 2010. A work plan proposes investigation activities designed to characterize SWMUs, AOCs, consolidated units, aggregate areas, canyons, or watersheds. An investigation report presents the data, evaluates the results, determines the site status, and recommends additional investigation, remediation, monitoring, or NFA, as appropriate. One hundred and nineteen other plans, reports, and miscellaneous documents were submitted to NMED in 2010. Thirty-four SWMUs and AOCs were granted Certificates of Completion under the Compliance Order on Consent by NMED in 2010.

The following sections provide summaries of the investigations for which activities were started, continued, and/or completed in 2010 and those investigations for which reports were submitted in 2010.

Upper Los Alamos Canyon Aggregate Area. The results of the aggregate area investigation were provided in an investigation report, which was revised in 2010. NMED approved the revised report and granted Certificates of Completion for 21 sites in the Upper Los Alamos Canyon Aggregate Area. A Phase II work plan was submitted in 2010 to complete the investigations at the remaining sites in the Upper Los Alamos Canyon Aggregate Area.

Accelerated corrective action activities were conducted at former TA-32 for four sites. Additional samples were collected and a total volume of approximately 4.2 m^3 (5.5 yd^3) was excavated at one site. The data indicated the nature and extent of contamination are defined at three former TA-32 sites and no potential unacceptable risks or doses to human and ecological receptors from Laboratory releases are present. Sampling results showed that the extent of contamination has not been defined at one site. Additional sampling will be implemented as part of the Phase II investigation of the Upper Los

Alamos Canyon Aggregate Area. No further investigation or remediation activities are warranted at the other sites.

Interim measure activities were conducted in the drainage downgradient of a former septic system, referred to as the Los Alamos Site Monitoring Area 2 (LA-SMA-2) drainage. The interim measure activities were implemented to mitigate contaminant migration to and within Los Alamos Canyon and included removal of contaminated environmental media from the downgradient drainage; installation of best management practices to prevent contaminants from the mesa top from migrating into the downgradient drainage; construction of surface water retention and sediment deposition basins in Los Alamos Canyon below the drainage; and characterization and disposal of waste generated during removal activities in accordance with applicable regulatory requirements.

A total of 454 m^3 (594 yd^3) of polychlorinated biphenyl (PCB)-contaminated media were removed from the outfall and drainage during the interim measure activities. At the base of the drainage, 1,751 m^3 (2,290 yd^3) of PCB-contaminated sediment has been removed. Following the removal of contaminated sediment and rock, a total of 107 confirmation samples were collected from the site. Supplemental interim measure activities included additional removal of contaminated environmental media and collection of confirmation samples from the downgradient drainage. Implementation of the interim measures achieved the desired objectives of reducing the contaminant inventory in the drainage system below the former septic tank and controlling contaminant migration. Additional removal, stabilization, and sampling activities are scheduled for the mesa-top portion of the site as part of the Phase II investigation for Upper Los Alamos Canyon Aggregate Area.

Upper Mortandad Canyon Aggregate Area. The aggregate area investigation report was submitted and revised in 2010. The extent of contamination has not been defined at 31 sites. Additional sampling is needed to define the vertical and/or lateral extent of one or more chemicals of potential concern (COPCs) at each of these sites. A Phase II investigation work plan was submitted, which presented the proposed sampling and analyses needed to define the extent of contamination at each of the 31 sites. NMED approved the revised report and granted Certificates of Completion for six sites in the Upper Mortandad Canyon Aggregate Area.

North Ancho Canyon Aggregate Area. The aggregate area investigation report was completed and submitted in 2009 and subsequently revised in 2010. NMED approved the revised report and granted Certificates of Completion for seven sites in the North Ancho Canyon Aggregate Area. Six sites require additional sampling to define the extent of contamination, one of which also requires additional remediation. A Phase II investigation work plan was submitted, which described the activities needed to complete the investigation and/or remediation of the remaining five SWMUs and one AOC. The Phase II investigation work plan also included the abandonment of five shallow wells and 12 angled boreholes, and the final removal of remaining waste and contaminated media at two landfill sites.

Upper Sandia Canyon Aggregate Area. The aggregate area investigation report was submitted and subsequently revised in 2010. The revised report was approved by NMED. Six hundred and eight surface samples, shallow subsurface samples (< 10 ft below ground surface [bgs]), and deep subsurface samples (10 to 65 ft bgs) were collected from 256 locations and submitted for laboratory analyses.

The nature and extent of contamination have been defined for 24 sites and have not been defined for 41 sites. The 24 sites for which nature and extent are defined have been determined to pose no potential unacceptable risk or dose to human and ecological receptors from Laboratory releases. The Laboratory requested Certificates of Completion for the 24 sites in the Upper Sandia Canyon Aggregate Area.

A Phase II work plan to address the remaining 41 sites will be submitted to NMED.

S-Site Aggregate Area. The aggregate area investigation report was submitted in CY 2010. A total of 3,288 samples of soil, sediment, and rock samples from the surface, shallow subsurface, and deep subsurface were collected during the 2009-2010 investigations. Drilling operations included 26 boreholes at the V-Site Subaggregate, 10 boreholes at the 300s Line Subaggregate, and 12 boreholes at the P-Site Subaggregate to a maximum depth of 30 ft bgs.

The extent of contamination has been defined at six sites. Human health and ecological risk assessments were performed for these sites. Five sites do not pose a potential unacceptable risk to human health and the environment and are recommended for corrective action complete. One site was found to pose potential unacceptable risk to human health, and corrective actions are recommended. Three sites were also recommended for corrective action complete on the basis that there is no history or evidence of releases of hazardous constituents.

The nature and extent of contamination have not been defined for 59 sites. Additional sampling is needed to define the lateral and/or vertical extent of contamination at each of these sites. The Laboratory will provide a Phase II investigation work plan to address the additional sampling required to complete the characterization of these sites.

Upper Canada del Buey Aggregate Area. The aggregate area investigation report was submitted to NMED in 2010. A total of 738 soil, sediment, and rock samples were collected from the surface, shallow subsurface, and deep subsurface. The sampling included 50 boreholes drilled from 10 to 26 ft bgs. Four inactive septic tanks were removed, and confirmation samples were collected from each excavation following removal.

The extent of contamination has been defined at six sites. Human health and ecological risk assessments were performed for four of six sites. The human health risk-screening assessment results indicate no potential unacceptable risks from COPCs at the four sites evaluated. The ecological risk-screening assessment results indicate no potential unacceptable risks to any receptor at the evaluated sites. No COPCs were detected above background at one of the remaining two sites, and no COPCs were detected at depth intervals relevant to human health risk assessments at the other site.

The Laboratory recommended corrective actions complete without controls for the six sites for which the nature and extent of contamination have been defined. In addition, one site previously recommended for no further action was recommended for corrective actions complete with controls.

The extent of contamination has not been defined at 49 sites. The Laboratory will provide a Phase II investigation work plan to address the additional sampling required to complete characterization at these sites.

Pueblo Canyon Aggregate Area. The Phase II aggregate area investigation report was submitted to NMED in 2010. The Phase II investigation included 31 surface and shallow subsurface samples collected from 18 locations at four sites and the drilling of 14 vertical boreholes and the collection of 28 samples at three sites. In addition, approximately 234 m^3 (306 yd^3) of sediment, soil, and rock was excavated at one site. Confirmatory samples were collected, and the excavation was backfilled with clean fill material delivered from off site.

Based on the analytical results from the investigations, the nature and extent of all COPCs are defined at the six sites investigated. The human health risk-screening assessment results indicated no potential unacceptable risks at the six sites. The ecological risk-screening assessment results indicated no potential unacceptable risks to any receptor at the six sites.

Threemile Canyon Aggregate Area. The aggregate area investigation report was submitted and subsequently revised in 2010. The revised report was approved by NMED. A total of 764 surface and shallow subsurface soil, sediment, and rock samples were collected from 358 locations. Nine boreholes were drilled to depths ranging from 10 to 182.5 ft bgs. Two septic tanks were removed during the 2009–2010 investigation. Following the removal of the septic tanks, confirmation samples were collected from each excavation.

The extent of contamination has not been defined at any of the 26 sites investigated. Additional sampling is needed to define the vertical and/or lateral extent of one or more contaminants at each of the sites. Remediation is recommended for six sites. The Laboratory will provide a Phase II investigation work plan to address the additional sampling required.

TA-49. The TA-49 investigation reports for outside and inside the nuclear environmental site (NES) boundary were submitted and subsequently revised in 2010. The investigation activities included collection of 2,438 surface and shallow subsurface soil samples from 1,219 locations for gross-alpha and -beta radiological screening. Of these screening samples, 1,058 samples from 569 locations were submitted for laboratory analyses. In addition to the surface sampling, 144 soil and tuff samples were collected from 41 boreholes with a maximum depth of 192 ft bgs. Pore-gas samples were collected from at least one borehole at each area and analyzed for volatile organic compounds (VOCs) and tritium. Both revised reports were approved by NMED.

The extent of contamination has been defined at Area 5. These sites have been determined to pose no potential unacceptable risk or dose to human health or the environment. Certificates of Completion were requested for one AOC and one SWMU. Extent of contamination at Area 6 West is defined, but additional sampling is necessary to determine whether potential contamination from dioxins and furans is present.

The extent of contamination has not been defined at Area 1, MDA AB Area 2 (2A, 2B), Area 3, Area 4, Area 10, Area 11, and Area 12. Additional sampling is necessary to define the lateral and vertical extent of one or more contaminants at each of these sites. Phase II investigation work plans will be prepared to address the additional sampling, and the required data analysis will be conducted to define extent at the sites inside and outside the NES boundary. In addition, a separate work plan has been developed to address the inorganic background concentrations for Unit 4 of the Tshirege Member of the Bandelier Tuff.

The VOC pore-gas data were compared with screening values based on equilibrium partitioning of vapor with groundwater standards or screening levels to evaluate the potential for the reported VOC concentrations to result in contamination of groundwater. Pore-gas data indicate that VOCs in subsurface pore gas are not a potential source of groundwater contamination. Tritium pore-gas data were compared with the groundwater maximum contaminant level (MCL) for tritium. For the most part, tritium activities in vapor samples were low. However, tritium activities in one borehole located at Area 12 exceeded the groundwater MCL for tritium and may represent a potential source of groundwater contamination. The Phase II investigation work plan for sites inside the NES boundary will propose that this borehole be re-sampled to confirm the results.

Consolidated Units 16-007(a)-99 (30s Line) and 16-008(a)-99 (90s Line). A supplemental investigation report was submitted to and approved by NMED. Consolidated Units 16-

007(a)-99 (the 30s Line) and 16-008(a)-99 (the 90s Line) have been characterized and remediated. Results of the drilling and sampling indicate the extent of contamination has been defined. The remediation of the HE-contaminated soil and tuff at the 30s Line and the chromium VI contaminated soil at the 90s Line were successfully completed. All established target cleanup levels for the HE and chromium VI remediation were met.

A groundwater monitoring well was developed and will be sampled on a quarterly basis for one year as part of the groundwater monitoring in the Water Canyon/Cañon de Valle watershed, conducted under the annual Interim Facility-Wide Groundwater Monitoring Plan.

The Laboratory will continue to inspect erosion controls installed in the drainages to the 90s Line Pond and collect sediment samples from the 90s Line Pond.

Consolidated Unit 16-021(c)-99 (260 Outfall) Corrective Measure Implementation (CMI). The CMI summary report and an addendum to that report for the 260 Outfall were submitted in 2010.

The removal activities and final confirmation sampling at the lower 260 Outfall drainage channel were conducted in April 2010. No potential unacceptable risks exist for the industrial, construction worker, and residential scenarios for the 260 Outfall drainage channel.

The Sanitary Wastewater System Consolidation (SWSC) cut sediment toxicity testing of chironomids was completed in March 2010. The toxicity test results indicated that no significant reductions in *Chironomus tentans* survival or growth occurred in the SWSC cut sediment.

To confirm the effectiveness of the CMI plan characterization and remediation activities, the Laboratory submitted a CMI monitoring plan to NMED. The plan is designed to assess the performance of the four CMI treatment systems (a low-permeability cap, injection grouting of the surge bed, carbon filter treatment systems of spring waters, and permeable reactive barrier [PRB] treatment system in Cañon de Valle) to determine whether the objectives of the treatment systems have been met, and to repair and/or adjust the treatment systems as necessary to ensure maximum effectiveness. The monitoring effectiveness will be evaluated following a one year period of activities.

The structural integrity of the low-permeability cap and surrounding storm water control structures will be inspected and maintained. One alluvial well was installed in the vicinity of the former settling pond to monitor the performance of surge bed injection grouting within the former settling pond area. Treated spring water discharged from the carbon filter systems will be monitored to assess the performance of the carbon filter systems at SWSC, Burning Ground, and Martin Springs. Multiple upgradient and downgradient alluvial wells and vessel test ports will be monitored to test the effectiveness of the pilot PRB system and the effects of the system on the alluvial water in Cañon de Valle.

MDA C. The Laboratory submitted a Phase III investigation work plan, which was approved by NMED.

Three of the four new vapor monitoring wells proposed in the work plan have been installed. The fourth well will be located outside of the MDA C fence and will be installed in early 2011. The borehole cuttings for the two vapor monitoring wells located outside of the fenced area of MDA C will be used to characterize background concentrations of inorganic chemicals detected in dacite rocks.

Regional aquifer well R-60 was installed downgradient of MDA C. The R-60 borehole was drilled to a total depth of 1,418 ft bgs. The primary objective of the R-60 well is to provide hydrogeologic and groundwater data on the regional aquifer below the MDA. Secondary objectives were to collect drill-cutting samples, conduct borehole geophysical logging, and investigate potential perched groundwater zones. In order to optimize the location, the second regional groundwater monitoring well proposed in the Phase III work plan will be sited and drilled following two rounds of sampling of the new deep vapor wells.

MDA G. The Laboratory continues to monitor VOCs and tritium in subsurface pore gas at MDA G. The Laboratory reports these monitoring results in periodic monitoring reports.

Data from the groundwater monitoring network around TA-54 show sporadic detections of a variety of contaminants including several VOCs. The temporal and spatial nature of the occurrences does not, however, clearly indicate the presence of a discernable plume or a source related to MDA G or other sources at TA-54. The results of the screening and evaluation of the groundwater data indicate that there is no compelling evidence for the presence of contamination from MDA G in wells downgradient of MDA G. The majority of the organic compounds that have been detected are generally associated with the first year of sampling following well completion or redevelopment. These organic compounds are not persistent after the first few rounds of sampling at a well, or they are detected only sporadically and near their respective detection limits.

The supplemental soil vapor extraction (SVE) pilot study report was submitted in 2010. The results of the 2010 SVE pilot test, as well as previous testing at MDAs G and L, further demonstrated that active SVE would be an effective remedial technology for removing VOCs from the subsurface at MDA G.

The Laboratory submitted a second revision of the Corrective Measure Evaluation (CME) report to NMED in 2010. Technologies were first screened for applicability to MDA G and then combined into corrective measure alternatives. The alternatives were screened against balancing criteria and combined by source area into a recommended alternative. The recommended alternative includes constructing an evapotranspiration cover over the pits and shafts and constructing and operating an SVE system to achieve remedial action objectives. The recommended alternative assumes removing all existing surface structures, including concrete foundations and asphalt, before the selected remedy is implemented. The recommended alternative meets the remedial action objectives. The remedy selected was based on the ability of the recommended alternative to (1) achieve cleanup objectives in a timely manner, (2) protect human and ecological receptors, (3) control or eliminate the sources of contaminants, (4) control migration of released contaminants, and (5) manage remediation waste in accordance with state and federal regulations.

MDA H. The Laboratory continues to monitor VOCs and tritium in subsurface pore gas at MDA H. The Laboratory reports these monitoring results in periodic monitoring reports.

Data from the groundwater monitoring network at TA-54 show sporadic detections of a variety of potential contaminants, including several VOCs, general inorganic chemicals, trace metals, and tritium. The temporal and spatial nature of the occurrences does not, however, clearly indicate the presence of a discernable plume or a source related to MDA H.

In 2010, the Laboratory submitted a CME report for MDA H to NMED. Technologies were screened for applicability to MDA H and then combined into corrective measure alternatives. The alternatives were screened against balancing criteria and combined by source area into a recommended alternative. The recommended alternative includes constructing an evapotranspiration cover over the shafts and implementing institutional controls to prevent human intrusion. Implementation of the recommended alternative satisfies all remedial action objectives.

MDA L. The Laboratory continues to monitor VOCs and tritium in subsurface pore gas at MDA L. The Laboratory reports these monitoring results in periodic monitoring reports.

The Laboratory submitted a revised CME report to NMED in 2010. Technologies were first screened for applicability to MDA L and then combined into corrective measure alternatives. The alternatives were screened against balancing criteria and combined by source area into a recommended alternative.

The recommended alternative includes constructing an engineered erosion-resistant vegetative cover over the pit, impoundments, and shafts and constructing and operating an SVE system to achieve remedial action objectives. The recommended alternative assumes removing all existing surface structures, including concrete foundations and asphalt before the selected remedy is implemented. The recommended alternative meets the remedial action objectives. The remedy selected was based on the ability of the recommended alternative to (1) achieve cleanup objectives in a timely manner; (2) protect human and ecological receptors; (3) control or eliminate the sources of contaminants; (4) control migration of released contaminants; and (5) manage remediation waste in accordance with state and federal regulations.

Los Alamos/Pueblo Canyons. The geomorphic conditions were surveyed above and below sediment transport mitigation sites in the Los Alamos Canyon and Pueblo Canyon watersheds. Los Alamos and Pueblo canyons were subject to a series of storm events in August 2010 that resulted in significant damage to some of the sediment control structures and gauges installed as part of the mitigation project plan. An interim assessment was conducted to provide documentation of all bank and channel erosion, channel scour or undercutting, and deposition related to the sediment control structures; conduct an evaluation of any newly created flow paths; and determine any other changes that could affect the performance of the structures and monitoring stations. The interim assessment summarizes the impact of the storms and provides a schedule for repairing damages that require interim actions.

Pajarito Canyon. The approved sampling and analysis plan specified that active stream channel samples would be collected each year in the Pajarito Canyon watershed, and up to eight additional fine-grained sediment samples were identified as “contingency” samples to be collected in the event large floods occurred. A total of four active channel sediment samples were collected in the Pajarito Canyon watershed in 2010.

Antimony, americium-241, plutonium-238, and plutonium-239/240 were detected above the sediment background values (BVs) in the sample collected from the MDA G-7 drainage. These results are similar to previous years. Dioxin and furan congeners and semi-volatile organic compounds (SVOCs) were added to the analytical suite for these stations in 2010. Dioxin and furan congeners were detected in each sample, while no SVOCs were detected. The results are less than dioxin and furan congener results in sediment previously measured from other locations farther west in the Pajarito Canyon watershed and from Pueblo Canyon in areas receiving runoff from the Los Alamos town site.

The bird nest box monitoring plan was revised and approved by NMED. Insects collected from occupied nest boxes were analyzed for key chemicals of potential ecological concern (COPECs). The analytical data indicated elevated cadmium and lead in insects in one reach, (which also has higher concentrations of in sediment samples) than the other reaches sampled for insects. The concentrations of cadmium and lead in insects represent a potential for adverse ecological effects, and their distribution is consistent with a Laboratory source.

Other lines of evidence for evaluating risks to cavity-nesting birds include field measures of nest success. Such studies have not identified any potential for ecological risk in the Pajarito watershed. Overall, the weight-of-evidence indicates that COPECs in the Pajarito reaches do not pose a potential risk to population abundance or persistence and species diversity of avian ground invertivore feeding guild species.

Potrillo/Fence Canyons. The canyons investigation report was submitted to NMED in 2010. The sediment investigations focused on characterizing the nature, extent, and concentrations of COPCs in post-1942 sediment deposits in nine reaches in the Potrillo and Fence watershed.

The investigations of potential shallow groundwater include observations from six boreholes drilled in Potrillo Canyon and one borehole drilled in Fence Canyon. Only the Fence Canyon borehole, FCO-1, has been maintained as a monitoring well. No shallow groundwater has been observed, and therefore, no groundwater samples have been collected. Because well FCO-1 has been dry since installation, it was removed from the Interim Facility-Wide Groundwater Monitoring Plan in 2010.

No persistent surface water occurs in Potrillo or Fence canyons; therefore, surface water does not present potential ecological or human health risks, and no surface water COPCs were identified. Storm water comparison values were exceeded by aluminum and by gross-alpha radiation in samples from Potrillo Canyon. However, the results represent natural background conditions.

The human health risk assessment for Potrillo and Fence canyons indicates no unacceptable risks or doses from COPCs in sediment under a recreational scenario. The COPECs identified in the ecological risk screening assessment were compared with results from other watersheds where more detailed biota investigations have been conducted. This comparison indicated concentrations of COPECs in Potrillo and Fence Canyons are not likely to produce adverse ecological impacts, and no additional biota investigations, mitigation, or monitoring is required.

The conditions for sediment are likely to stay the same or improve because of decreases in contaminant concentrations after peak releases; therefore, no further monitoring of sediment is necessary. However, several firing sites in the watershed remain active, and additional releases are possible. SWMUs and AOCs present in the watershed will be characterized as part of the Potrillo and Fence Canyons Aggregate Area investigation. Potential contaminant transport will be monitored under the requirements of the

NPDES Individual Permit for Storm Water Discharges from certain SWMUs and AOCs at Los Alamos National Laboratory.

MDA B. Excavation activities at MDA B commenced on June 30, 2010. Remediation activities included the removal of an asphalt cover that was present over 75% of MDA B and removal of soil overburden from the east end of MDA B. MDA B was split into a grid of cells, each measuring 10 ft long by 10 ft wide. Remedial action progress through December 2010 included excavation of 201 grid cells. Excavation operations generally consisted of overburden removal, contaminated soil and waste removal, and confirmation sampling.

Eight air-monitoring network (AIRNET) stations are located along the northern boundary of MDA B. Each AIRNET station collects airborne radionuclides, such as plutonium, americium, and uranium, on a particulate filter and a water vapor sample (for measuring tritium) in a silica gel cartridge. Air sampling along the northern boundary of MDA B indicated a maximum dose of 0.9 mrem to the public for 2010. These measurements are significantly lower than the EPA air pathway limit of 10 mrem per year.

Nine exploratory trenches were excavated in 2010 to determine whether waste was present in Areas 9 and 10. The investigation activities concluded that no waste was buried in Areas 9 and 10. As a result, remediation and further investigation are not required for Areas 9 and 10 of MDA B, not only because no operational waste was found buried there, but because soil and fill in those areas do not contain contaminants that exceed residential screening levels.

The 17 confirmation samples collected from four enclosures had no detected concentrations of organic chemicals that exceeded residential soil screening levels (SSLs). Two of the seven confirmation samples from enclosure 3 had arsenic results exceeding residential SSLs, but all other inorganic and organic chemical results from those samples were below SSLs, and all the radionuclide results from those samples were below residential screening action levels (SAL). One of three confirmation samples from enclosure 1 had plutonium-239/240 results that exceeded the residential SAL; thus additional excavation was conducted, and four additional confirmation samples were collected at various depths within that grid cell. None of the subsequent results exceeded the residential SSLs or SALs. The SAL for plutonium-239/240 was also exceeded in the one confirmation sample collected from the bottom of the trench in enclosure 2. No additional tuff removal is planned because excavation in that trench has reached a depth at which continued excavation is impractical. Three confirmation samples were collected from the trench in enclosure 7. The SAL for plutonium-239/240 was exceeded in the sample collected from the bottom of the enclosure 7 trench; excavation will continue to deeper levels. No other confirmation sample results exceeded SSLs or SALs. No confirmation samples have been collected from the trench in enclosure 12 to date.

DP Site Aggregate Area. Phase II aggregate area investigation activities were conducted at 19 SWMUs, one AOC, and six consolidated units. The Phase II investigation activities included collecting 226 surface and subsurface soil and tuff samples from 175 locations to define the extent of contamination. Two boreholes were drilled to a depth of 200 ft bgs in the area of diesel tank 21-57, which defined the extent of diesel contamination. Remediation activities at the PCB site removed all material contaminated with 1 mg/kg or greater of total PCBs within 10 ft bgs. Approximately 1,400 yd^3 of PCB-contaminated material were removed, and a total of 300 confirmation samples were collected and analyzed for PCBs.

The Laboratory submitted the Phase II investigation report to NMED, which was subsequently revised. The extent of contamination has been defined for 15 sites and has not been defined at 11 sites. The 11 sites at which extent was not defined will be addressed in a Phase III work plan.

Sixteen sites have been determined to pose no potential unacceptable risk or dose to human and ecological receptors. Five sites within the DP Site Aggregate Area were determined to pose potential unacceptable risk or dose to human health, and one site also poses potential risk to ecological receptors. Limited soil removal and confirmation sampling will be conducted at these sites as part of a Phase III investigation. Corrective actions are complete for 12 sites.

American Reinvestment and Recovery Act (ARRA) for TA-21. The status of the ARRA projects as of December 2010 was as follows:

- The decontamination and decommissioning and subsequent demolition of 24 buildings at TA-21 has been completed. The last building was demolished in December 2010.
- The excavation activities at the MDA B site commenced on June 30, 2010.
- The installation of 16 groundwater monitoring wells has been completed. The wells range in depth from 850 feet to 1,400 feet. Six existing wells were plugged and abandoned.

Interim Facility-Wide Groundwater Monitoring Plan. The 2010 Interim Facility-Wide Groundwater Monitoring Plan was approved with modification. Water monitoring in 2010 included base flow, alluvial groundwater, intermediate-perched groundwater, and regional aquifer groundwater in seven major watersheds or watershed groupings: Los Alamos/Pueblo canyons, Sandia Canyon, Mortandad Canyon, Pajarito Canyon, Water Canyon/Cañon de Valle, Ancho/Chaquehui/Frijoles canyons, and White Rock Canyon. Monitoring beyond LANL boundaries was conducted in areas affected in the past by

LANL operations as well as in areas unaffected by LANL for the purpose of providing baseline data.

2.17.3 Site/Facility Categorization

No new nuclear environmental sites were added to the DOE/LANL Nuclear Facilities List during 2010 (Table 2-19).

Table 2-19. Environmental Sites with Nuclear Hazard Classification

Site	Description	2008 SWEIS	NHC LANL 2010*
TA-21; SWMU 21-014	MDA A (General's Tanks)	2	2
TA-21; Consolidated Unit 21-016(a)-99	MDA T	2	2
TA-35; AOC 35-001	MDA W	3	3
TA-49; SWMUs 49-001(a), 49-001(b), 49-001(c), and 49-001(d)	MDA AB	2	2
TA-50	MDA C	2	2
TA-54; SWMU 54-004	MDA H	3	3
TA-54; Consolidated Unit 54-013(b)-99	MDA G, as an element of TA-54 Waste Storage and Disposal Facility, Area G	2	2

* DOE List of Los Alamos National Laboratory Nuclear Facilities (DOE 2010a).

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3.0 Site-Wide 2010 Operations Data

Chapter 3 summarizes operational data at the site-wide level. It compares actual operating data to projected environmental effects for the parameters discussed in the SWEIS, including effluent, workforce, regional, and long-term environmental effects.

3.1 Air Emissions

3.1.1 Radiological Air Emissions

In the 2008 SWEIS No Action Alternative, radiological air emissions are projected to remain at levels similar to those projected in the 1999 SWEIS. However, short-term increases could occur during construction or decontamination, decommissioning, and demolition (DD&D) activities, as well as MDA remediation, canyon cleanup, and other actions related to the implementation of the Consent Order.

Radiological airborne emissions from point sources (i.e., stacks) during 2010 totaled approximately 298 curies, less than one percent of the annual projected radiological air emissions of 34,000[1] curies projected in the 2008 SWEIS.

The two largest contributors to radiological air emissions were tritium from the Tritium Facilities (both Key and Non-Key) and activation products from LANSCE. Stack emissions from the Tritium Key Facility were about 64 curies. The total point source emissions from LANSCE were approximately 211 curies.

Non-point sources of radiological air emissions are present at LANSCE, Area G, and other locations around LANL. Non-point emissions, however, are generally small compared with stack emissions. For example, non-point air emissions from LANSCE were approximately 20 curies. Additional detail about radioactive air emissions is provided in LANL's 2010 annual compliance report to the EPA (LANL 2011b), submitted in June 2011, and in the 2010 Environmental Report (formerly the Environmental Surveillance Report) (LANL 2011c).

Maximum off-site dose for 2010 to the maximum exposed individual was 0.33 millirem. The EPA radioactive air emissions limit for DOE facilities is 10 millirem per year. This dose is calculated to the theoretical maximum exposed individual who lives at the

[1] The projected radiological air emissions changed from the 10-year annual average of 21,700 curies in the 1999 SWEIS to 34,000 curies in the 2008 SWEIS. Annual radiological air emissions from 1999–2005 were used to project the air emissions in the 2008 SWEIS. Emissions of activation products from LANSCE were much higher in those years due to a failure in one component of the emissions control system. The system was repaired in CY 2006, which has significantly decreased emissions.

nearest off-site receptor location 24 hours per day, eating food grown at that same site. No actual person received a dose of this magnitude.

3.1.2 Non-Radiological Air Emissions

Emissions of Criteria Pollutants. The 2008 SWEIS projects criteria pollutants would be smaller than those shown in the operating permit and well below the ambient standards established to protect human health with an adequate margin of safety. Minor non-radiological air quality impacts are projected to occur from the construction of the CMRR NF at TA-55, completion of the TA-16 Engineering Complex, demolition of structures at TA-16, construction of new buildings at the consolidated Two-mile Mesa Complex within TA-22, and implementation of the Consent Order.

Criteria pollutants include nitrogen oxides, sulfur oxides, carbon monoxide, and particulate matter. LANL, in comparison to industrial sources and power plants, is a relatively small source of these non-radioactive air pollutants. As such, LANL is required to estimate emissions, rather than perform actual stack sampling. As Table 3-1 illustrates, CY 2010 emissions of criteria pollutants are far below the estimated emissions presented in the SWEIS.

Table 3-1. Emissions of Criteria Pollutants as Reported on LANL's Annual Emissions Inventory*

Pollutants	Units	2008 SWEIS	2010 Operations
Carbon monoxide	Tons/year	58	17.2
Nitrogen oxides	Tons/year	201	23.7
Particulate matter	Tons/year	11	2.7
Sulfur oxides	Tons/year	0.98	0.6

* Emissions included on the annual Emissions Inventory Report do not include insignificant sources.

Criteria pollutant emissions from LANL's fuel burning equipment are reported in the annual Emissions Inventory Report as required by the New Mexico Administrative Code, Title 20, Chapter 2, Part 73 (20.2.73 New Mexico Administrative Code [NMAC]). The report provides emission estimates for the steam plants, nonexempt boilers, the TA-03 combustion turbine, and the TA-60 asphalt plant. In addition, emissions from the data disintegrator, carpenter shops, degreasers, oil storage tanks, and permitted beryllium machining operations are reported. For more information, refer to LANL's Emissions Inventory Report for 2010 (LANL 2011d). In CY 2010, over half of the significant criteria pollutants (nitrogen oxides and carbon monoxide) resulted from the TA-03 steam plant.

In April 2004, LANL received a Title V Operating Permit from the NMED. This permit included facility-wide emission limits and additional recordkeeping and reporting requirements. Table 3-2 summarizes the facility-wide emission limits in the Title V

Operating Permit, the 2008 SWEIS emission projections and the 2010 actual emissions from all sources included in the permit. Note that emissions from insignificant sources of boilers, heaters, and emergency generators are included in these totals. All emissions were below the levels projected in the 2008 SWEIS.

Table 3-2. 2010 Emissions for Criteria Pollutants as Reported on LANL's Title V Operating Permit Emissions Reports*

Pollutants	Units	2008 SWEIS	Title V Facility-Wide Emission Limits	2010 Emissions
Carbon monoxide	Tons/year	58	225	36.5
Nitrogen oxides	Tons/year	201	245	51.0
Particulate matter	Tons/year	11	120	4.7
Sulfur oxides	Tons/year	0.98	150	0.9

* The Title V Operating Permit Emissions Report includes two categories of sources not required in the annual emission inventory: small, exempt boilers and heaters and exempt standby emergency generators.

Chemical Usage and Emissions. Chemical usage and calculated emissions for Key Facilities are reported using ChemLog. The quantities presented here represent all chemicals procured or brought on site in the respective CY. This methodology is identical to that used by LANL for reporting under Section 3.1.2.3 of the Emergency Planning and Community Right-to-Know Act (42 USC 11023) and for reporting regulated air pollutants estimated from research and development operations in the annual Emissions Inventory Reports (LANL 2011d).

Air emissions presented in Appendix B are listed as emissions by Key Facility. Emission estimates (expressed as kilograms per year) were performed in the same manner as those reported in previous Yearbooks. First, usage of listed chemicals was calculated per facility. It was then estimated that 35 percent of the chemical used was released into the atmosphere. Emission estimates for some metals, however, were based on an emission factor of less than one percent. This is appropriate because these metal emissions are assumed to result from cutting or melting activities. Fuels such as propane and acetylene were assumed to be completely combusted; therefore, no emissions are reported.

Information on total VOCs and hazardous air pollutants (HAPs) estimated from research and development operations is shown in Table 3-3. Projections by the SWEIS for VOCs and HAPs were expressed as concentrations rather than emissions; therefore, direct comparisons cannot be made, and projections from the SWEIS are not presented. The VOC emissions reported from research and development activities reflect quantities procured in each CY. The HAP emissions reported from research and development activities generally reflect quantities procured in each CY. In a few cases, however, procurement values and operational processes were further evaluated so that actual air emissions could be reported instead of procurement quantities.

Table 3-3. Emissions of VOCs and HAPs from Chemical Use in Research and Development Activities

Pollutant	Emissions (Tons/year)	
	2009	2010
HAPs	5.2	3.8
VOCs	13.5	6.7

Greenhouse Gas Emissions. LANL reported its greenhouse gas emissions from stationary combustion sources to the US Environmental Protection Agency (EPA) for the first time in CY 2010 in response to new federal regulations. The stationary combustion sources at LANL include permitted generators, emergency back-up generators, the asphalt plant, the power plant, the combustion turbine, and all boilers. In CY 2010, these stationary combustion sources emitted 60,354 metric tons of carbon dioxide equivalents. Table 3-4 shows the breakdown of emissions from LANL's stationary sources by gas type.

Table 3-4. Emissions from LANL's Stationary Sources

Gas Name	Units	2008 SWEIS	2010 Emissions
Methane	Tons/year CO2e	*	1.16
Nitrous Oxide	Tons/year CO2e	*	0.12
Carbon Dioxide	Tons/year CO2e	*	60,292.4

* The 2008 SWEIS did not project greenhouse gas emissions.

Methane has approximately 21 times the global warming potential of carbon dioxide, and nitrous oxide has approximately 310 times the global warming potential of carbon dioxide. Methane and nitrous oxide are weighted respectively when calculating the mass of carbon dioxide equivalents emitted.

3.2 Liquid Effluents

To reduce the potential impacts of LANL activities on water resources, LANL has several programs that monitor and protect surface water quality and quantity.

LANL implemented the Outfall Reduction Program to reduce the total number of outfalls discharging to the environment. From January 1, 2010, through December 31, 2010, LANL had 15 (14 industrial outfalls and one sanitary outfall) wastewater outfalls that were regulated under NPDES Permit No. NM0028355. Based on discharge monitoring reports prepared by LANL's Water Quality and RCRA Group, 12 permitted outfalls had recorded flows in CY 2010 totaling an estimated 141.8 million gallons. This is approximately 8.5 million gallons more than the CY 2009 total of 133.3 million gallons. The 2010 total volume of discharge is below the maximum flow of 279.5 million gallons that was projected in the 2008 SWEIS. Treated wastewater released from LANL’s NPDES outfalls rarely leaves the site. Details on NPDES noncompliance during 2010 is provided in the 2010 Environmental Report (LANL 2011c).

CY 2010 discharges are summarized by watershed and compared with watershed totals projected in the SWEIS in Table 3-5. The bulk of the CY 2010 discharges came from Non-Key Facilities (Table 3-6).

Key Facilities accounted for approximately 37 million gallons of the 2010 total. LANSCE discharged approximately 18 million gallons in 2010, about 0.2 million gallons more than in 2009, accounting for about 48 percent of the total discharge from all Key Facilities (Table 3-6). Table 3-6 compares NPDES discharges by Key and Non-Key Facilities.

LANL has three principal wastewater treatment facilities—the SWWS at TA-46 (a Non-Key Facility), the RLWTF at TA-50 (one of the Key Facilities), and the HEWTF at TA-16 (one of the Key Facilities). The TA-16 HEWTF did not discharge in CY 2010.

The RLWTF (TA-50-0001) Outfall 051 discharges into Mortandad Canyon. During CY 2010, about 0.57 million gallons of treated radioactive liquid effluent, about 0.53 million gallons less than CY 2009, were released to Mortandad Canyon from the RLWTF, compared with 4.0 million gallons projected in the 2008 SWEIS.

Table 3-5. NPDES Discharges by Watershed (Millions of Gallons)

Watershed	# Outfalls 2008 SWEIS	Discharge 2008 SWEIS	Discharge CY 2010
Cañada del Buey	1[a]	0	0
Guaje	0	0	0
Los Alamos	5	45.6	17.4
Mortandad	5	44.3	2.48
Pajarito	0	0	0
Pueblo	0	0	0
Sandia	6	187.3	121.4
Water[b]	5	2.26	0.54
Totals	**22**	**279.5**	**141.8**

a Includes Outfall 13S from the SWWS, which is registered as a discharge to Cañada del Buey or Sandia. The effluent is actually piped to TA-03 and ultimately discharged to Sandia Canyon via Outfall 001.

b Includes 05A-055 discharge to Cañon de Valle, a tributary to Water Canyon.

Table 3-6. NPDES Discharges by Facility (Millions of Gallons)

Key Facility	# Outfalls 2008 SWEIS	Discharge 2008 SWEIS	Discharge CY 2010
Plutonium Complex	1	4.1	1.04
Tritium Facility	2	17.4	0
CMR Building	1	1.9	0
Sigma Complex	1	5.8	0.85
High Explosives Processing	3	0.06	0
High Explosives Testing	1	2.2	0.54
LANSCE	2	28.2	17.88
Metropolis Center	1	13.6	16.78
Biosciences	None	0	0
Radiochemistry Facility	None	0	0
RLWTF	1	4.0	0.57
Pajarito Site	None	0	0
MSL	None	0	0
TFF	None	0	0
Machine Shops	None	0	0
Waste Management Operations	None	0	0
Non-Key Facilities	5	200.9	104.2*
Totals	**15**	**279.5**	**141.8**

* Mainly due to discharge from SWWS and the TA-03 steam plant.

Discharges from the Non-Key Facilities made up the majority of the total CY 2010 discharge from LANL. This total, 104.2 million gallons, was about 96.7 million gallons less than the 200.9-million-gallon total discharge from the Non-Key Facilities that was projected in the 2008 SWEIS. Two Non-Key Facilities, the TA-46 SWWS and the TA-03 steam plant (both of which discharge through Outfall 001), account for about 91 percent of the total discharge from Non-Key Facilities and about 67 percent of all water discharged by LANL.

The NPDES Multi-Sector General Permit (MSGP) Program regulates storm water discharges from identified industrial activities and their associated facilities. These activities include metal fabrication; primary metals; hazardous waste treatment, storage, and disposal; vehicle and equipment maintenance; recycling activities; electricity generation; and asphalt manufacturing.

The current permit for MSGP was issued by the EPA on September 29, 2008. In December 2008, Los Alamos National Security, LLC (LANS) submitted to the EPA a Notice of Intent for coverage under the MSGP. The intent of the MSGP is to authorize storm water discharges from specified facilities and minimize the discharge of potential pollutants.

The MSGP-2008 required the development and implementation of site-specific Storm Water Pollution Prevention Plans (SWPPPs), which must include identification of potential pollutants and the implementation of BMPs. The Permit also requires monitoring of storm water discharges from permitted sites for specified constituents, personnel training, site inspections, and implementation of corrective actions.

Compliance with the MSGP-2008 requirements for the LANL permitted facilities was achieved primarily by implementing the following:

- Identify potential pollutants and activities that may impact surface water quality and identify and provide structural and non-structural controls (BMPs) to limit the impact of those pollutants.
- Develop and implement facility-specific SWPPPs.
- Perform routine facility inspections and conduct required corrective action.
- Perform required benchmark and impaired waters storm water monitoring of specific analytical parameters for the industrial activities listed under the permit.

To achieve compliance with the MSGP during CY 2010, LANL operated 29 storm water monitoring stations at 19 different locations.

On February 13, 2009, EPA Region 6 issued NPDES Individual Permit (IP) No. NM0030759 to co-permittees LANS and the DOE. Immediately following issuance of the IP by the EPA, the Permit was publicly appealed. Following permit modification negotiations in 2009, the EPA issued a Final Permit Modification Decision in September 2010. The effective date for this new modified IP was November 1, 2010. The purpose of the IP is to regulate storm water discharges from 405 specified SWMUs and AOCs. It also establishes a schedule for implementation of control measures, monitoring, specified corrective actions, and reporting for the regulated sites. The IP requires monitoring at 250 Site Monitoring Areas. The purpose of storm water monitoring is to compare against applicable Target Action Levels (TALs) set forth in the IP. If a TAL is exceeded, permittees must take corrective action measures identified in the Permit. These measures are then certified to the EPA upon completion. Additional IP requirements include development and implementation of a Site Discharge Pollution Prevention Plan, site inspections, training, recordkeeping, semi-annual public meetings, and a public website.

Storm water discharges from construction activities disturbing one or more acres, including those construction activities that are part of a larger common plan of development collectively disturbing one or more acres are regulated by the NPDES Construction General Permit (CGP). Parties subject to the CGP typically include both LANL and the general contractor performing the construction work.

LANL and the general contractor apply individually for NPDES CGP coverage and both are permittees at most construction sites. Compliance with the NPDES CGP includes the development and implementation of a SWPPP before soil disturbance can begin and site inspections once soil disturbance has commenced. A SWPPP describes the project activities, site conditions, BMPs, and permanent control measures required for reducing pollution in storm water discharges and protecting endangered or threatened species and critical habitat. Compliance with the NPDES CGP is demonstrated through periodic inspections that document the condition of the site and identify corrective actions to minimize pollutant discharges from the construction site.

During 2010, the Laboratory implemented CGP requirements at 48 permitted construction sites and performed 599 site-specific storm water inspections. The percentage of compliant inspections for the year was 99.5.

3.3 Solid Radioactive and Chemical Wastes

Due to the complex array of facilities and operations, LANL generates a wide variety of waste types including solids, liquids, semi-solids, and contained gases. These waste streams are variously regulated as solid, hazardous, LLW, TRU, or wastewater by a host of state and federal regulations. The institutional requirements relating to waste management at LANL are located in a series of documents that are part of the Laboratory's Institutional Procedures. These requirements specify how all process wastes and contaminated environmental media generated at LANL are managed. Wastes are managed from planning for waste generation for each new project through final disposal or permanent storage of those wastes. This ensures that LANL meets all requirements including DOE Orders, federal and state regulations, and LANL permits.

LANL's waste management operation captures and tracks data for waste streams, regardless of their points of generation or disposal. This includes information on the waste generating process, quantity, chemical and physical characteristics of the waste, regulatory status of the waste, applicable treatment and disposal standards, and final disposition of the waste. The data are ultimately used to assess operational efficiency, help ensure environmental protection, and demonstrate regulatory compliance.

The 2008 SWEIS projected cumulative waste generation rates for all waste types to be substantially large due to future remediation and DD&D of facilities. Actual waste volumes from remediation may be smaller, depending on regulatory decisions by the NMED, and because of waste volume reduction techniques.

LANL generates radioactive and chemical wastes as a result of research, production, maintenance, and construction. In addition, EP Directorate performs cleanup operations of sites and facilities formerly involved in weapons research and development. EP Directorate includes the operations and responsibilities of the previous ER Project. Table 3-7 summarizes waste types and generation for LANL in CY 2010.

Waste generators are assigned to one of three categories—Key Facilities, Non-Key Facilities, and EP. Waste types are defined by differing regulatory requirements. Compliance with the Consent Order is projected to cause remediation of a large number of PRSs and MDAs from fiscal year (FY) 2007 through FY 2016. Waste volumes associated with the Removal Option are presented in the 2008 SWEIS, Appendix I, Table I-70. The annual waste volume projection from Table I-70 will be used as the projection for EP waste types for the SWEIS Yearbooks.

Table 3-7. LANL Waste Types and Generation[a]

Waste Type	Units	2008 SWEIS	CY 2010
Chemical	10^3 kg/yr	8,899.1	3,777.30
LLW	m^3/yr	162,224	26,793.68
MLLW	m^3/yr	39,107	113.85
TRU	m^3/yr	4,812	58.77
Mixed TRU	m^3/yr	[b]	56.27

a Waste projections for Key and Non-Key Facilities were based off the 2008 SWEIS, Chapter 5 (page 5-139), Table 5-39, Radioactive and Chemical Waste from routine operations, No Action Alternative. ER waste projections were based off the 2008 SWEIS, Appendix I (I-185), Table I-70, Removal Option Annual Waste Generation Rates (Implementation of the Consent Order for 2008) (DOE 2008c).

b The 2008 SWEIS combines TRU and Mixed TRU into one waste category since they are managed for disposal at WIPP.

Waste quantities from CY 2010 LANL operations were significantly below SWEIS projections for all waste types, reflecting the levels of operations at both the Key and Non-Key Facilities.

3.3.1 Chemical Wastes

The 2008 SWEIS projected chemical waste to decline for normal operations at LANL; however, significant quantities of this waste type are expected due to environmental restoration activities. Chemical waste includes not only construction and demolition debris, but also all other non-radioactive wastes passing through the Solid Radioactive and Chemical Waste Facility. In addition, construction and demolition debris is a component of those chemical wastes that in most cases are sent directly to off-site disposal facilities. Construction and demolition debris consists primarily of asbestos and construction debris from DD&D projects. Construction and demolition debris is disposed of in solid waste landfills under regulations promulgated pursuant to Subtitle D of RCRA. (Note: Hazardous wastes are regulated pursuant to Subtitle C of RCRA.) DD&D waste volumes are tracked in Section 3.11.2.

Chemical waste generation for LANL in CY 2010 was about 39 percent of the chemical waste volume projected in the 2008 SWEIS. Table 3-8 summarizes chemical waste generation during CY 2010.

EP chemical wastes accounted for about 31 percent of the EP chemical waste volumes projected in the 2008 SWEIS.

Table 3-8. Chemical Waste Generators and Quantities

Waste Generator	Units	2008 SWEIS	CY 2010
Key Facilities	10^3 kg/yr	596	253.50
Non-Key Facilities	10^3 kg/yr	650	1,142.53[a]
EP	10^3 kg/yr	7,653.1[b,c]	2,381.27
LANL	10^3 kg/yr	8,899.1	3,777.30

a Chemical waste generation at the Non-Key Facilities exceeded the SWEIS projections due primarily to the start of the DD&D of the former Administration Building (TA-03-0043).

b Used conversion 1,100 kg/1 m^3. 1,100 kg was derived from adding all of EP waste for CY 2008.

c Projected annual waste generation for FY 2010 from Implementation of the Consent Order, Removal Option, 2008 SWEIS (Table I-70).

3.3.2 Low-Level Radioactive Wastes (LLW)

The 2008 SWEIS projected that LLW generation would increase from waste generated from MDA removal and LLW would exceed the TA-54, Area G capacity, which would require offsite disposal. In CY 2010 LLW volumes were well below volumes projected in the SWEIS (Table 3-9). LLW generation in CY 2010 for LANL and EP combined was about 9 percent of the LLW volumes projected in the 2008 SWEIS.

Table 3-9. LLW Generators and Quantities

Waste Generator	Units	2008 SWEIS	CY 2010
Key Facilities	m^3/yr	7,646	2,883.95
Non-Key Facilities	m^3/yr	1,529	174.03
EP	m^3/yr	153,049[ab]	23,735.70
LANL	m^3/yr	162,224	26,793.68

a Includes low-level, alpha low-level, and remote-handled LLW.

b Projected annual waste generation for FY 2010 from Implementation of the Consent Order, Removal Option, 2008 SWEIS (Table I-70).

3.3.3 Mixed Low-Level Radioactive Wastes (MLLW)

The 2008 SWEIS projected MLLW generation to increase, but the quantity is projected to be less than two percent of the quantity of LLW generation. EP produced about 13 cubic meters of MLLW in 2010, less than one percent of the volumes projected in the 2008 SWEIS. Table 3-10 examines these wastes by generator categories.

Table 3-10. MLLW Generators and Quantities

Waste Generator	Units	2008 SWEIS	CY 2010
Key Facilities	m^3/yr	68	29.10
Non-Key Facilities	m^3/yr	31	71.84[c]
EP	m^3/yr	39,008[a,b]	12.91
LANL	m^3/yr	39,107	113.85

a Includes mixed low-level, mixed alpha low-level, and mixed remote-handled low-level radioactive waste.

b Projected annual waste generation for FY 2010 from Implementation of the Consent Order, Removal Option, 2008 SWEIS Table I-70)

c Mixed Low-Level Waste generation at the Non-Key Facilities exceeded the SWEIS projections due to a legacy waste clean out in order for the Facility Operations Director to bring TA-03-0016 into compliance and a cold and dark (pre-D&D) status.

3.3.4 Transuranic Wastes

In CY 2010, TRU wastes were generated almost exclusively in three Key Facilities (the Plutonium Facility Complex, the CMR Building, and the Solid Radioactive and Chemical Waste Facility), as well as Non-Key Facilities. EP did not produce any TRU waste in CY 2010. Table 3-11 examines TRU wastes by generator categories.

Table 3-11. Transuranic Waste Generators and Quantities

Waste Generator	Units	2008 SWEIS	CY 2010
Key Facilities	m^3/yr	413[a]	55.31
Non-Key Facilities	m^3/yr	23[a]	3.46
EP	m^3/yr	4,376[a,b]	0
LANL	m^3/yr	4,812[a]	58.77

a The 2008 SWEIS combines TRU and mixed TRU into one waste category since they are both managed for disposal at WIPP.

b Projected annual waste generation for FY 2010 from Implementation of the Consent Order, Removal Option, 2008 SWEIS (Table I-70).

3.3.5 Mixed Transuranic Wastes

In CY 2010, mixed TRU wastes were generated at four facilities—the Plutonium Facility Complex, the CMR Building, the Radioactive Liquid Waste Treatment Facility and the Solid Radioactive and Chemical Waste Facility. The 2008 SWEIS combines TRU and mixed TRU waste into one waste category since they are both managed for disposal at WIPP. See Table 3-11 for 2008 SWEIS projections. Table 3-12 examines mixed TRU wastes by generator categories.

Table 3-12. Mixed Transuranic Waste Generators and Quantities

Waste Generator	Units	2008 SWEIS	CY 2010
Key Facilities	m^3/yr	[a]	56.27
Non-Key Facilities	m^3/yr	[a]	0
EP	m^3/yr	[a,b]	0
LANL	m^3/yr	[a]	56.27

a The 2008 SWEIS combines TRU and mixed TRU into one waste category since they are both managed for disposal at WIPP.

b Projected annual waste generation from Implementation of the Consent Order, Removal Option, 2008 SWEIS (Table I-70).

3.3.6 Sanitary Waste

LANL sanitary waste generation and transfer of waste to the Los Alamos County Landfill, now the Eco Station, has varied considerably over the last decade, with a peak (more than 14,000 tons) transferred to the landfill in 2000 that was due to removal of Cerro Grande Fire debris.

The 2008 SWEIS projected that the Los Alamos County Landfill would not reach capacity until about 2014. In 2002, the DOE/NNSA renewed the special use permit for the County to operate waste disposal, transfer, and post-closure at the County landfill site. The Los Alamos County solid waste landfill was replaced by a transfer station. In compliance with NMED regulations, a landfill closure plan containing post-closure operations and maintenance manual with all the information needed to effectively monitor and maintain the facility for the entire post-closure period was submitted in September 2005.

DOE/NNSA has implemented goals for Waste Minimization (WMin). LANL has instituted an aggressive WMin and recycling program that has reduced the amount of waste disposed in sanitary landfills.

LANL's total waste generation can be classified as routine and non-routine. The waste can also be categorized as recyclable and non-recyclable. Table 3-13 shows LANL sanitary waste generation for CY 2010. The recycle of total (routine and non-routine) sanitary waste for CY 2010 was 53 percent compared with 1993 when LANL recycled only about 10 percent of the sanitary waste.

Table 3-13. LANL Sanitary Waste Generation in CY 2010 (metric tons)

	Routine	Non-routine	Total
Recycled	499	2,326[a]	2,825
Landfill disposal	1,559	119[b]	1,678
Total	2,058	2,445	4,503

a Brush, dirt, metal, concrete, and asphalt
b Construction and demolition debris, non-hazardous solid waste from TA-54.

Routine sanitary waste consists mostly of food and food-contaminated waste and cardboard, plastic, glass, Styrofoam packing material, and similar items. Non-routine sanitary waste is typically derived from construction and demolition projects, including all recycled metal. Until May 1998, construction debris was used as fill to construct a land bridge between two areas of LANL; however, environmental and regulatory issues resulted in this activity being halted. Construction of new facilities and demolition of old facilities are expected to continue to produce substantial quantities of this type of waste. Recycling programs for concrete, asphalt, dirt, and brush were established in FY 2001 and, as a result, LANL is recycling more construction waste and decreasing landfill disposal.

3.3.7 The Pollution Prevention Program

The P2 Program improves LANL operations by minimizing environmental impacts and adverse regulatory findings. LANL's commitment to P2 and broader environmental stewardship arises from two goals: 1) maintaining a sustainable environmental and ecological condition for present and future employees, residents, and neighbors and 2) complying with the many regulatory requirements necessary to operate LANL. To reach these goals, LANL's P2 Program approach focuses on the following:

- Ensuring that LANL policies and procedures highlight prevention as the preferred methodology to eliminate or reduce environmental impacts;
- Integrating waste minimization (WMin) and P2 principles into the planning process;
- Supporting the development of new technologies, as well as process improvement opportunities, to eliminate or reduce waste;
- Working with waste generators to identify WMin and P2 opportunities;
- Using appropriate material substitution to eliminate or reduce toxic characteristics;
- Complying with DOE Order 430.2B,
    - by use of energy- and water-efficient equipment,
    - by procurement of environmentally sustainable products, and
    - by sustainable design in new buildings and major renovations;

- Recycling and reusing materials; and
- Tracking, projecting, and analyzing waste data to identify waste generation targets and continually reduce waste.

3.4 Utilities

Ownership and distribution of utility services continue to be split between DOE/NNSA and Los Alamos County as members of the Los Alamos Power Pool, a partnership agreement with Los Alamos County and LANL established in 1985. DOE/NNSA owns and distributes most utility services to LANL facilities, and the County provides these services to the communities of White Rock and Los Alamos.

Utility infrastructure demands for electricity, natural gas, and water are projected to increase for LANL through 2020, and among other Los Alamos County users who rely upon the same utility systems as LANL through 2013.

3.4.1 Gas

Los Alamos County and LANL receive their natural gas from the Public Service Company of New Mexico (PNM). The gas pipeline comes from Bloomfield, NM to Los Alamos. At the end of 2009, the Combustion Gas Turbine Generator (CGTG) was installed and operational. The CGTG serves as one of LANL's on-site energy sources by producing electricity from the combustion of fuel. The CGTG is capable of producing 27 megawatts and is available to serve the Los Alamos Power Pool and regional utility network on an as required basis for peak-load shaving and emergency situations.

Table 3-14 presents LANL's CY 2010 gas usage. Approximately 91 percent of the gas used by LANL was for heat production. The remainder was used for electricity production. LANL electricity generation is used to fill the difference between peak loads and the electricity import capability and for training of the power plant operators in turbine operation.

Total gas consumption for CY 2010 was less than projected in the 2008 SWEIS.

Table 3-14. Gas Consumption (decatherms[a]) at LANL/CY 2010

Category	Total LANL Consumption Base	Total Used for Electricity Production	Total Used for Heat Production	Total Steam Production (klb)[b]
2008 SWEIS	1,197,000[a]	Not projected	Not projected	Not projected
CY 2010	1,102,443[a]	94,657[a]	1,007,785[a]	309,178[c]

a A decatherm is equivalent to 1,000 to 1,100 cubic feet of natural gas.
b klb: Thousands of pounds
c TA-03 steam production has two components: that used for electricity production (22,222 klb in CY 2010) and that used for heat
(279,733 klb in CY 2010).
Note: Any difference between consumption and production is due to feedwater heating.

3.4.2 Electrical

LANL is supplied with electricity through the Los Alamos Power Pool. The DOE and Los Alamos County entered into a 10-year contract (with extensions) known as the Electric Coordination Agreement whereby each entity's electricity resources are consolidated or pooled. Changes in transmission agreements with PNM resulted in the removal of contractual restraints on Power Pool resources import capability. Import capacity is now limited only by the physical capability (thermal rating) of the transmission lines that is approximately 110 to 120 megawatts from a number of hydroelectric, coal, and natural gas power generators throughout the western United States.

On-site electricity generation capability for the Power Pool is limited by the existing TA-03 Co-generation Complex (the power plant generates both steam and power), which is capable of producing up to 10 megawatts of electricity with the steam driven turbine generators #1 and #2 and 27 megawatts from the CGTG for a total of 37 megawatts that is shared by the Power Pool under contractual arrangement. The #3 steam turbine at the Co-generation Complex is a 10-megawatt unit, but is out of service due to the condenser failure and costs to repair it are prohibitive at this time. Currently, there are no plans to upgrade existing equipment.

In an effort to beneficially use the LANL TA-61 "brownfield" landfill site, the County is proposing to lease and use approximately 15 acres of the 46 acres of land it operated as a landfill for the installation of up to 2.5 MW of PV to generate electric power. The project began in 2010. The system will be connected to a 7MWHr battery storage system, which, in turn, will be connected to the Los Alamos Power Pool infrastructure.

The ability to accept additional power into the Los Alamos Power Pool grid is limited by the regional electricity import capability of the existing northern New Mexico power transmission system. Population growth in northern New Mexico, together with expanded industrial and commercial usage, has greatly increased power demands on the regional power system. LANL has completed several construction projects to expand the existing power capabilities.

The current transmission line configuration is no longer vulnerable to a single failure taking out both incoming transmission lines. The LANL 115-kilovolt system includes redundancies to enhance reliability of our sources. The construction of the portion of the line from the Norton substation to Southern Technical Area is still under consideration, and various options are being evaluated.

Within the existing underground ducts, LANL's 13.2-kilovolt distribution system must be upgraded to fully realize the capabilities of the Western Technical Area substation and the upgraded Eastern Technical Area substation. Upgrades will provide for redundant feeders to critical facilities, and upgrading the aging TA-03 substation will complete the 13.2-kilovolt distribution and 115-kilovolt transmission systems.

In the 2008 SWEIS No Action Alternative, LANL total electricity consumption was reduced to a number closer to the average actual electricity consumption for the six years analyzed making the new total 495,000 megawatt-hours. In addition, the electricity peak load under the No Action Alternative is 91,200 kilowatts.

Elements of the Expanded Operations alternative were discussed in the two SWEIS RODs. Expansion of the capabilities and operational levels at the Metropolis Center to support the Roadrunner Super Computer platform was one of the few elements of the Expanded Operations Alternative that was approved to go forward. This decision would impact the total electricity peak demand and the total electricity consumption at LANL; therefore, the LANL total in Table 3-15 under the 2008 SWEIS represents 91,200 kilowatts for LANL plus 18,000 kilowatts operating requirements for the Metropolis Center. In 2010, no RODs were issued for the 2008 SWEIS.

Table 3-16 shows annual use of electricity for CY 2010. LANL's electricity use remains below projections in the SWEIS. Actual use has fallen below these values and projected brownouts have not occurred. However, on a regional basis, failures in the PNM system have caused blackouts in northern New Mexico and elsewhere.

Table 3-15. Electricity Peak Coincidental Demand/CY 2010[a]

Category	LANL Base	LANSCE	Metropolis Center[b]	LANL Total	County Total	Pool Total
2008 SWEIS	57,200	34,000	18,000[c]	103,200[d]	19,800	111,000
CY 2010	43,294	18,061	7,853	69,208	13,262	82,470

a All figures in kilowatts.
b Metropolis Center became a new Key Facility in the 2008 SWEIS.
c Expanded Operations Alternative limit for Metropolis Center.
d This number represents 91,200 kilowatts for LANL as part of the No Action Alternative in the 2008 SWEIS plus 12,000 kilowatts (18,000 kilowatts Expanded Operations Alternative limit – 6,000 kilowatts No Action Alternative) to expand the capabilities and operational levels of the Metropolis Center as stated in the SWEIS RODs. This was corrected from the 2008 SWEIS Yearbook.

Table 3-16. Electricity Consumption/CY 2010a

Category	LANL Base	LANSCE	Metropolis Center[b]	LANL Total	County Total	Pool Total
2008 SWEIS	356,000	139,000	131,400[c]	582,400[d]	150,000	645,000
CY 2010	267,704	91,730	66,374	425,808	124,967	550,775

a All figures in megawatt-hours.
b Metropolis Center became a new Key Facility under the 2008 SWEIS.
c Expanded Operations Alternative limit for Metropolis Center.
d This number represents 495,000 megawatt-hours for LANL under the No Action Alternative plus 87,400 (131,400 Expanded Operations limit – 44,000 No Action Alternative) megawatt-hours to expand the capabilities and operational levels of the Metropolis Center as stated in the SWEIS ROD dated September 2008. This was corrected from the 2008 Yearbook.

Operations at several of the large-LANL-load facilities changed during 2004. In 2004 LANSCE changed their operating schedule. For several years prior to 2004 their electricity demand peaked with the rest of LANL, usually in July or August. But, with this change in operations LANSCE's peak demand shifted to the winter (around January). This changed the overall electricity demand for LANL from summer to winter, since LANSCE's load is such a large part of LANL's total load. This was true for LANSCE's operation until about November of 2005 when due to budgetary constraints, LANSCE returned to their old schedule of running operations in the summer.

It is proposed that ground will be broken on the CMRR NF near TA-55 off Pajarito Road in the near future. This building will replace the old CMR building, which is served by the TA-03 substation. The CMRR NF is proposed to be served by upgraded feeders from the TA-03 and Eastern Technical Area substations. The new load will be shared between the substations, and the present CMR load will be removed so that very little additional load will be added to the system.

Electrical Infrastructure Safety Upgrades Project Project Overview. The Electrical Infrastructure Safety Upgrades (EISU) Project seeks to upgrade the electrical infrastructure in buildings throughout LANL to improve electrical safety. Typically, the project seeks to correct National Electrical Code violations; replace aging, unsafe equipment; and improve equipment and facility grounding.

The Conceptual Design Report for the EISU Project was completed in 1998. Thirty-one buildings were identified for upgrades and were prioritized based on the safety hazards they presented. Since then, the EISU Project has been coordinated with the LANL Ten-Year Comprehensive Site Plan and subprojects have been removed from the list as the buildings have been identified for D&D. To date, five subprojects have been removed from the list for a new total of 26 General Plant Projects. An evaluation of the LANL electrical safety maintenance backlog may increase the number of subprojects under the EISU Project.

3.4.3 Water

Before September 1998, DOE supplied all potable water for LANL, Bandelier National Monument, and Los Alamos County, including the towns of Los Alamos and White Rock. This water was obtained from DOE's groundwater right to withdraw 5,541.3 acre-feet per year or about 1,806 million gallons of water per year from the main aquifer. On September 8, 1998, DOE leased these water rights to Los Alamos County. This lease also included DOE's contractual annual right obtained in 1976 to 1,200 acre-feet per year of San Juan-Chama Transmountain Diversion Project water. The lease agreement was effective for three years until September 8, 2001. In September 2001, DOE/NNSA officially turned over the water production system and transferred 70 percent of the water rights to Los Alamos County. Los Alamos County has continued to lease the remaining 30 percent of the water rights from DOE/NNSA. LANL is now considered a customer of Los Alamos County. Los Alamos County is continuing to pursue the use of San Juan-Chama water as a means of maintaining those water rights. Los Alamos County has completed a preliminary engineering study and is currently negotiating a contract, which will provide more stability, before further investment.

LANL has installed water meters on high-usage facilities and has a Supervisory Control and Data Acquisition/Equipment Surveillance System on the distribution system to keep track of water usage and to determine the specific water use for various applications. Data are being accumulated to establish a basis for conserving water. LANL continues to maintain the distribution system by replacing portions of the over-60-year-old system as problems arise.

Elements of the Expanded Operations alternative were discussed in the two RODs. Expansion of the capabilities and operational levels at the Metropolis Center to support the Roadrunner Super Computer platform, and MDA remediation were two of the few elements of the Expanded Operations Alternative that were approved to go forward.

Expansion of the Metropolis Center to support the Roadrunner Super Computer platform would impact water usage at LANL. Expanding to a 15-megawatt maximum operating platform is expected to potentially increase current water usage to 51 million gallons (193 million liters) per year. This higher usage would include the additional water lost to cooling tower evaporation and blowdown. Improvements to the SERF will lead to increased use of recycled effluent in the cooling towers. Metropolis Center water consumption is not metered. Water usage will be reported once the facility is metered. Also, 58 million gallons of water over 10 years is projected for MDA remediation activities.

Table 3-17 shows water consumption in million gallons for CY 2010. Under the No Action Alternative of the 2008 SWEIS, water use at LANL is projected to be 380 million gallons plus the elements of the Expanded Operations Alternative. In CY 2010, LANL consumed approximately 413 million gallons. Actual use by LANL in 2010 was about 5.1 million gallons less than the 2008 SWEIS projection. In addition, the calculated NPDES discharge of 141.8 million gallons (see Table 3-6) in CY 2010 was about 37 percent of the total LANL usage of 384 million gallons.

Table 3-17. Water Consumption (million gallons) for CY 2010

Category	LANL Base	Metropolis Center[a]	Los Alamos County	Total
2008 SWEIS ROD	417.8[b]	51[c]	1,241	1,621
CY 2010	412.7	Not Available[d]	Not Available[e]	Not Available[e]

a Metropolis Center became a new Key Facility under the 2008 SWEIS.

b This number represents 380 million gallons for LANL under the No Action Alternative plus 32 million gallons (51 Expanded Operations limit – 19 No Action Alternative) to expand the capabilities and operational levels of the Metropolis Center, and 5.8 million gallons of water to be used during MDA remediation activities as stated in the SWEIS RODs. This was corrected from the 2008 Yearbook.

c Cooling water needed in support of Metropolis Center expansion to support Roadrunner. Improvements to the SERF will lead to increased use of recycled effluent in the cooling towers.

d Metropolis Center water consumption is not metered. Water use will be reported once system is metered.

e In September 2001, Los Alamos County acquired the water supply system and LANL no longer collects this information.

The County bills LANL for water and all future water use records maintained by LANL will be based on those billings. The distribution system used to supply water to LANL facilities now consists of a series of reservoir storage tanks, pipelines, and fire pumps. The LANL distribution system is primarily gravity fed with pumps available for high-demand fire situations at limited locations.

3.5 Worker Safety

It is the policy of LANL to conduct work safely and responsibly; ensure a safe and healthful working environment for workers, contractors, visitors, and other on-site personnel; and protect the health, safety, and welfare of the general public. It is LANL's policy to not compromise safety for personal, programmatic, operational, or other reasons.

An Institutional Worker Safety and Security Team (IWSST) has been established at the Laboratory with the mission to improve safety and security through direct involvement of all people performing work. The IWSST represents all workers and reports directly to the Laboratory Director. Membership on the IWSST includes a representative and alternate from each Directorate within the Laboratory and from each of the primary contractors. Specific objectives of the IWSST include the following:

- Advocate safety and security as core values at the Laboratory.
- Promote communication of safety and security concerns and actions across organizations.
- Engage all people conducting business on behalf of the Laboratory in personal and corporate safety and security.
- Encourage ideas and actions that reduce risk and occurrence of incidents and accidents.
- Serve as Points of Contact (POCs) for any worker at the Laboratory with a safety or security concern or idea.
- Track and address individual safety and security concerns raised by the worker, institutional safety, or security data.
- Evaluate and recommend improvements for the effectiveness of safety and security activities.
- Achieve a cooperative attitude for a safe and secure environment.
- Celebrate successes in demonstrating safe and secure behavior among workers at the Laboratory.
- Review concerns of workers over implementation of proposed policies concerning safety and security.
- Assist in the development of institutional goals, objectives, and measures with regard to safety and security.

Worker Safety and Security Teams (WSSTs) reside within the line organizations and act as conduits for sharing information and communicating decisions. Directorates, divisions, and group-level organizations have WSSTs. There are just over 100 WSSTs that are currently active. These teams escalate resolution of unresolved issues and promote two-way communication. A parallel structure exists for the ISO 14001: *Environmental Management Standard*. Directorate teams led by a Directorate point of contact (POC) develop annual Environmental Action Plans that guide continuous improvement. In many Directorates, the WSST coordinates the set of Environmental Management System (EMS) activities.

The purpose of the WSSTs is employee ownership of personal and institutional safety. To achieve this, the team provides input and receives feedback on safety and health issues. Employee involvement helps drive behaviors that support the Integrated Safety Management System (ISMS) and the development of a world-class safety program that moves toward zero accidents and injuries.

In 2010, LANL was accepted into the DOE-Voluntary Protection Program (VPP) at Merit Status. LANL received 23 Opportunities for Improvements as a result of the DOE-VPP assessment, which are being addressed. Many improvements were made in work control, expansion of behavior-based safety, and the completion of Human Performance Improvement (HPI) training by all managers and approximately 1,500 employees.

3.5.1 Accidents and Injuries

Analysis of LANL's injury and illness performance shows a marked improvement in 2010 over 2009 with respect to the Total Recordable Case (TRC) rate and in the Days Away, Restricted or Transferred (DART) rate. This has been influenced by a decrease in some types of injuries that have been historically high, such as repetitive trauma and slip/trip/fall injuries.

For 2010, there were approximately 141 recordable cases of occupational injury and illness with approximately 43 cases that resulted in days away of restricted or transferred duties per year. Table 3-18 summarizes CY 2010 occupational injury and illness rates. These rates correlate to reportable injuries and illnesses during the year for 200,000 hours worked or roughly 100 workers.

Table 3-18. Total Recordable and Lost Workday Case Rates at LANL

LANS	CY09	CY10	Percent Change	Total 2010 Cases
TRC Rate	1.96	1.58	19% Reduction	141
DART Rate	0.78	0.48	38% Reduction	43

3.5.2 Ionizing Radiation and Worker Exposures

Occupational radiation exposures for workers at LANL during CY 2010 are summarized in Table 3-19. The collective total effective dose (TED) for the LANL workforce during CY 2010 was 125.4 person-rem. Data in Table 3-19 show 61 fewer radiation workers received measurable dose in CY 2010 than CY 2009; with fewer workers and higher collective dose, the average non-zero dose per worker was higher by 11 mrem. Of the 125.4 person-rem collective TED reported for CY 2010, 0.128 person-rem was from internal exposures to radioactive materials, consisting of small plutonium, activation product, and tritium intakes. These reported doses could change with time because estimates of committed effective dose from radioactive material intakes in many cases are based on several years of bioassay results; as new results are obtained, the dose estimates may be modified accordingly.

Note: Dose terms were changed in the 2007 amendment of 10 CFR 835, *Occupational Radiation Protection*; the new terms are implemented at LANL and used in this update (e.g., total effective dose and committed effective dose).

Table 3-19. Radiological Exposure to LANL Workers*

Parameter	Units	2008 SWEIS	CY 2010
Collective TED (external + internal)	person-rem	280	125.4
Number of workers with measurable dose	number	2,018	1,335
Average non-zero dose: • external + internal radiation exposure	millirem	139	94

* Data in this report are current as of 12/31/2010.

The highest individual doses in CY 2010 indicate an overall decrease of typical doses received since CY 2000; senior management and the Institutional Radiation Safety Committee have set expectations and put in place mechanisms to further reduce individual and collective doses through performance goals and other As Low As Reasonably Achievable (ALARA) measures. For whole body doses, no worker exceeded the DOE's 5 rem/year dose limit, and no worker exceeded the 2 rem/year LANL administrative control level established for external exposures.

Table 3-20 summarizes the highest individual dose data for CYs 2001–2010.

Table 3-20. Highest Individual Annual Doses (TED) to LANL Workers (rem)*

CY 2001	CY 2002	CY 2003	CY 2004	CY 2005	CY 2006	CY 2007	CY 2008	CY 2009	CY 2010
1.284	2.214	25.960	2.500	2.300	1.238	7.430	2.106	1.142	1.198
1.225	1.897	8.700	1.510	2.051	1.148	1.642	1.198	0.933	0.940
1.123	1.783	5.700	1.148	2.000	1.060	1.573	1.132	0.932	0.859
1.002	1.644	3.500	1.061	1.603	1.053	1.508	1.096	0.885	0.856
0.934	1.534	1.935	1.055	1.398	0.971	1.503	0.952	0.877	0.833

* Data in this report are current as of 03/30/2011.

Comparison with the SWEIS Baseline. The collective TED for CY 2010 is about 45 percent of the 280 person-rem per year baseline in the 2008 SWEIS.

Work and Workload: Changes in workload and types of work at nuclear facilities, particularly the TA-55 Plutonium Facility, TA-53 LANSCE, and the TA-50 and TA-54 waste facilities, tend to increase or decrease the LANL collective TED. Worker exposure under the 2008 SWEIS No Action Alternative is projected to increase because of the dose associated with achieving a production level of 20 pits per year at TA-55, as well as the dose from increased activity and associated personnel at the proposed CMRR Nuclear Facility. In addition, collective worker dose and annual average worker dose are projected to increase due to the implementation of the actions related to the Consent Order, but the long-term effect of MDA cleanup and closure of waste management facilities at TA-54 will be reduced worker dose.

TA-55 operations accounted for about half of the occupational dose at LANL. CY 2010 doses in this facility were higher than CY 2009, as radiological work increased. Besides occupational exposure from both weapons manufacturing and Pu-238 work, work on repackaging materials, access to storage areas, and providing radiological control support for radiological work and system maintenance were major contributors to worker dose at TA-55.

In addition to TA-55 operations, significant portions of LANL collective dose were accrued by workers performing maintenance at TA-53 and workers performing retrieval, repackaging, and shipping of radioactive solid waste at LANL waste facilities at TA-50 and TA-54.

Internal doses reflect a combination of routine tritium doses from LANL tritium operations and unanticipated low-level intakes of plutonium and activation products. The highest reported internal dose (60 mrem committed effective dose) resulted from an airborne radioactivity exposure at TA-55.

ALARA Program: LANL occupational exposure continues to be deliberately managed, with associated processes and documentation regarding these occupational doses, work performed, dose optimization efforts, ALARA goal tracking, and other performance indicators. Based on established ALARA goals, dose accrual to date, and expected workload, CY 2011 collective doses are again expected to reach on the order of 100 rem. Improvements in maintaining radiation exposures ALARA, such as improved dose tracking during work activities, additional shielding, and better radiological safety designs being implemented for new and recurring radiological work, should result in continually lower LANL radiological worker doses relative to the work conducted.

Collective TEDs for Key Facilities. In general, extracting collective TEDs by Key Facility or TA is difficult because these data are collected at the group level, groups are often tenants in multiple facilities, and members of many groups receive doses at several locations. The fraction of a group’s collective TED coming from a specific Key Facility or TA can only be estimated. For example, personnel from the Health Physics

Operations group and crafts workers are distributed across the Laboratory, and these two organizations account for a significant fraction of the LANL collective TED. Approximately 80 percent of the collective TED that these groups incur is estimated to come from operations at TA-55. The total collective TED for TA-55 residents in CY 2010 was approximately 66 person-rem, a little over half of the LANL collective TED. As discussed previously, maintenance activities at TA-53 and solid waste operations at TA-50 and TA-54 also contributed significant dose to the LANL total.

3.6 Socioeconomics

LANL continues to be a major economic force within the region of influence consisting of Santa Fe, Los Alamos, and Rio Arriba counties.

The LANL-affiliated workforce continues to include LANS employees and subcontractors. In the 2008 SWEIS No Action Alternative, the 2005 levels of employment are assumed to remain steady at 13,504 employees. After 2005 the workforce decreased each year until 2009 when there was an increase in the number of workers already in the region with construction, Stimulus activities, DD&D activities, and actions related to the implementation of the Consent Order. As shown in Table 3-21, the number of employees has decreased from 2008 SWEIS projections by 14 percent. The 11,609 total employees at the end of CY 2010 reflect an increase of 1.4 percent as compared with the 11,445 employees reported in the 2009 SWEIS Yearbook.

Table 3-21. LANL-Affiliated Work Force

Category	LANS Employees	Technical Contractor	Non-Technical Contractor	KSL	SOC[a]	Total
2008 SWEIS[b]	12,019	945	Not projected[c]	[d]	540	13,504
CY 2010	10,605	509	79	0	416	11,609

a Securing Our Country (SOC) (formerly Protection Technology-Los Alamos)

b Total number of employees was presented in the SWEIS, the breakdown had to be calculated based on the percentage distribution shown in the 1999 SWEIS for the base year.

c Data were not presented for non-technical contractors or consultants.

d KBR/Shaw/LATA (KSL) employees converted to LANS under "CRAFT" Type of Appointment effective 12/2008.

LANL has had a positive economic impact on northern New Mexico. A University of New Mexico report (Bhandari 2011) indicated that, in 2009, the economic impact on northern New Mexico included $2.47 billion indirect output (operation and construction) and $1.4 billion on labor income. In addition, the report indicated an additional $1.6 billion in value added income to northern New Mexico (e.g., employee compensation, proprietor income, other property income, and indirect business income). No update on this data exists for 2010.

The residential distribution of LANS employees reflects the housing market dynamics of three counties. As seen in Table 3-22, 78 percent of the LANS employees reside in Los Alamos, Rio Arriba, and Santa Fe counties.

Table 3-22. County of Residence for LANS Employees[a]

Category	Los Alamos	Rio Arriba	Santa Fe	Other NM	Total NM	Outside NM	Total
2008 SWEIS[b]	6,617	2,701	2,566	1,080	12,964	540	13,504
CY 2010	4,483	1,663	2,170	903	9,219	1,386	10,605

a Includes both Regular and Temporary employees, including students who may not be at LANL for much of the year.

b Total number of employees was presented in the 2008 SWEIS, the breakdown was calculated based on the percentage distribution calculated from the 1999 SWEIS.

3.7 Land Resources

Land resources were examined during the development of the 2008 SWEIS. From 1999 through 2010, the land resources (i.e., undeveloped and developed lands) available for use at LANL have been reduced. Between CY 2001 and CY 2010, the following lands were transferred under Public Law 105-119[2] (42 USC 2391), which were analyzed in the Land Conveyance and Transfer Environmental Impact Statement (DOE 1999e) and managed by the Environmental Protection Division's Land Conveyance and Transfer Project Office:

- ~2,100 acres of land have been transferred to the Department of Interior to be held in trust for the Pueblo of San Ildefonso and
- ~340 acres of land have been conveyed to Los Alamos County

Tract C-1 (approximately 15 acres) and Tract A-13 (approximately 9 acres) were conveyed to Los Alamos County on November 30 and July 6, 2010 respectively. Table 3-23 provides a summary of the land parcels remaining to potentially be transferred or conveyed. Projects under construction in CY 2010 include the new Tactical Training

[2] On November 26, 1997, Congress passed PL 105-119 (42 USC 2391). Section 632 of this Act directed the Secretary of Energy to convey to the Incorporated County of Los Alamos, New Mexico, or to the designee of the County, and transfer to the Secretary of the Interior, in trust for the Pueblo of San Ildefonso, parcels of land under the jurisdictional administrative control of DOE at or in the vicinity of LANL. Such parcels, or tracts, of land must meet suitability criteria established by the Act. The Public Law expires November 2012.

The Act sets forth the criteria, processes, and dates by which the tracts will be selected, titles to the tracts reviewed, environmental issues evaluated, and decisions made as to the allocation of the tracts between the two recipients. DOE's responsibilities under the Act included identifying potentially suitable tracts of land, identifying any environmental restoration and remediation that would be needed for those tracts of land, and conducting NEPA review of the proposed conveyance or transfer of the land tracts. Under this Act, those land parcels identified suitable for conveyance and transfer must have undergone any necessary environmental restoration or remediation.

Facility, RLUOB and DD&D of TA-21. CY 2010 land use was similar to the previous CYs.

The EP Directorate is unique from a land use standpoint. Rather than using land for development, this program cleans up legacy wastes and makes land available for future use. In CY 2010, remediation of MDA B began, and this area will be made available for conveyance to Los Alamos County in the future. Through these efforts, LANL may make several large tracts of land available for use (DOE 1999e).

MDA remediation, canyon cleanup, and other actions related to the implementation of the Consent Order could cleanup several tracts of land identified for conveyance or transfer and, pending cleanup, may be made available for future use.

Table 3-23 Potential Land Transfer/Conveyance Tracts Analyzed in the Land Conveyance and Transfer Environmental Impact Statement

Land Tract	Acreage	Location
TA-21/A-16	250	On the eastern end of the same mesa on which the central business district of Los Alamos is located.
DP Canyon/A-10	13	Between the western boundary of TA-21 and the major commercial districts of the Los Alamos town site.
Rendija Canyon/ A-14 a, c, d	890	North of and below Los Alamos town site's Barranca Mesa residential subdivision.
TA-74 South/ A-18a	520	Southern reach of Pueblo Canyon between the White Rock Y and Airport.
B-3	3	Pueblo Canyon, situated within a preservation easement
DP Road South/ A-8 b	3	DP Road Site, situated west of MDA-B on south side of DP Road
Airport-3 South 2/ A-5-2	44	The Airport Site, situated north of TA-21 and south of NM 501
TA-21 West 2/A-15-2	1	DP Road
C-2, C-3 and C-4	150	Highway near White Rock "Y"

3.8 Groundwater

Under the No Action Alternative in the 2008 SWEIS, operation levels would be similar to the current levels; therefore, there would be little change in the flow of contaminants to the alluvial or regional groundwater. MDA remediation, canyon cleanup, and other actions related to the implementation of the Consent Order would not appreciably change the rate of transport of contaminants in the short term, but would likely reduce long-term contaminant migration and impacts on the environment.

The Laboratory performed significant groundwater compliance work in 2010 pursuant to the Consent Order. These activities included groundwater monitoring, groundwater investigations, and installation of monitoring wells and a hydrologic test well in support of various groundwater investigations and corrective measure evaluations (CMEs).

In 2010, LANL installed two monitoring wells (with three screens) in the perched intermediate groundwater zone and 12 monitoring wells (with 20 screens) in the regional aquifer (Table 3-24 and Figure 3-1). Intermediate well CdV-16-4ip was installed downgradient of the 260 Outfall in TA-16 as a hydrologic test well to evaluate the properties of the deep perched groundwater. Regional well R-3 was installed east of TA-74 to monitor for potential contamination near the municipal production well Otowi 1. Regional wells R-29 and R-30 were installed downgradient of TA-49 and MDA-AB. Regional well R-50 was installed on the mesa south of Mortandad Canyon as part of the ongoing chromium investigation. Regional wells R-50, R-51, R-52, R-53, R-54, R-55, R-56, and R-57 were installed to monitor for potential contamination from material disposal areas (MDAs) in TA-54 and to support CMEs for MDAs at TA-54.

Under ARRA Test Well 1, Test Well 1A, Test Well 2, Test Well 2A, Test Well 2B, and Test Well 4 were plugged and abandoned. Two alluvial wells in Water Canyon WCO-1 and WCO-3 were also plugged and abandoned and replacements were installed for them. Test Well 1 and Test Well 1A were replaced by TW-1Ar, Test Well 2 and Test Well 2A were replaced by TW-2Ar, WCO-1 was replaced by WCO-1r, and WCO-3 was replaced by WCO-3r.

In 2010 LANL sampled 232 groundwater wells, well ports, and springs in 561 separate sampling events.

Table 3-24. Wells and Boreholes Installed in 2010

Type[a]	Identifier	Watershed (Canyon)	Total depth (ft bgs)[b]	Screened interval (ft bgs)	Water level (ft bgs)	Comments
I	CdV-16-4ip	Cañon de Valle	1146.0	815.6–879.2 1110–1141.1	6655 (Screen 1) 6375 (Screen 2)	Hydrologic test well installed downgradient of the 260 Outfall (Consolidated Unit 16-021(c)-99) to evaluate the hydrologic properties of the deep perched intermediate groundwater zone in TA-16. Completed on 8/23/2010.
R	R-3	Pueblo	1006.8	974.5-995.0	5743	Monitoring well installed in Pueblo Canyon, near the eastern boundary of the Laboratory's TA-74. Objective of the well was to provide a regional aquifer monitoring well within potential contamination flow paths in the regional aquifer near municipal production well Otowi 1. Completed on 6/21/2010.
R	R-29	Water/ Ancho	1191.8	1170.0-1180.0	5949.2	Monitoring well installed to provide a regional aquifer monitoring well downgradient of TA-49 and MDA AB to determine whether zones of perched intermediate groundwater occur under MDA AB and to reduce geologic uncertainty. Completed on 3/31/2010.

Type[a]	Identifier	Watershed (Canyon)	Total depth (ft bgs)[b]	Screened interval (ft bgs)	Water level (ft bgs)	Comments
R	R-30	Water/ Ancho	1171.8	1140.0–1160.9	5949.8	Monitoring well installed to provide a regional aquifer monitoring well at the eastern edge of TA-49 and downgradient of MDA AB, to determine whether zones of perched intermediate groundwater occur under MDA AB, and to reduce geologic uncertainty. Completed on 4/3/2010.
R	R-50	Mortandad	1217.5	1077.0–1087.0 1185.0–1205.6	5837.0 (Screen 1) 5836.7 (Screen 2)	Monitoring well installed on the mesa south of Mortandad Canyon to define the southern extent of chromium contamination in the regional aquifer. Completed on 2/13/2010.
R	R-51	Pajarito	1046.1	915.0 to 925.2 1031.0 to 1041.0	5870.1 (Screen 1) 5868.6 (Screen 2)	Monitoring well installed west of MDAs H and J, and northwest of TA-18. Monitors TA-54 and other potential contaminant sources in Pajarito Canyon. Completed on 2/8/10.
R	R-52	Pajarito	1128.7	1035.2–1055.7 1107.0–1117.0	5865.7 (Screen 1) 5863.9 (Screen 2)	Monitoring well installed north-northeast of MDAs H and J, on mesa south of Cañada del Buey. Monitors for potential releases of contaminants from MDAs H and J. Completed on 3/31/10.
R	R-53	Pajarito	1001.9	849.2–859.2 959.7–980.2	5861.1 (Screen 1) 5852.0 (Screen 2)	Monitoring well installed north of MDA L in Cañada del Buey; monitors for potential releases from MDA L. Completed on 3/1/10.
R	R-54	Pajarito	936.0	830.0–840.0 915.0–925.0	5862.8 (Screen 1) 5864.6 (Screen 2)	Monitoring well installed immediately west of MDA L in Pajarito Canyon; monitors for potential releases from MDA L. Completed on 1/29/10.

Type[a]	Identifier	Watershed (Canyon)	Total depth (ft bgs)[b]	Screened interval (ft bgs)	Water level (ft bgs)	Comments
R	R-55	Pajarito	1021.0	860.0–880.6 994.4–1015.4	5698.8 (Screen 1) 5698.6 (Screen 2)	Monitoring well installed downgradient of MDA G; monitors for potential contaminant releases from MDA G and other sources in Pajarito Canyon. Completed on 8/25/2010.
R	R-56	Pajarito	1078.8	945.0–965.6 1046.6 – 1067.1	5858.5 (Screen 1) 5855.8 (Screen 2)	Monitoring well installed on Mesita del Buey between MDA G and MDA L; monitors for potential contaminant releases from MDAs G and L, and other sources in Pajarito Canyon. Completed on 7/19/2010.
R	R-57	Pajarito	1013.8	910.0–930.5 971.5–992.1	5758.5 (Screen 1) 5750.2 (Screen 2)	Monitoring well installed downgradient of MDA G at the eastern end of TA-54; monitors for potential releases from MDA G. Completed on 6/8/2010.
R	R-60	Pajarito	1360.9	1330.0–1350.9	5908.7	Monitoring well installed east of MDA C; monitors for potential contaminant releases from MDA C. Completed on 10/18/2010.
I	TW-2Ar	Pueblo	113.9	102.0–112.0	6553.3	Replacement monitoring well for TW-2A; monitors perched intermediate groundwater in lower Pueblo Canyon. Completed on 3/4/10.

a I = perched intermediate ground water zone well; R = regional aquifer well

b feet below ground surface

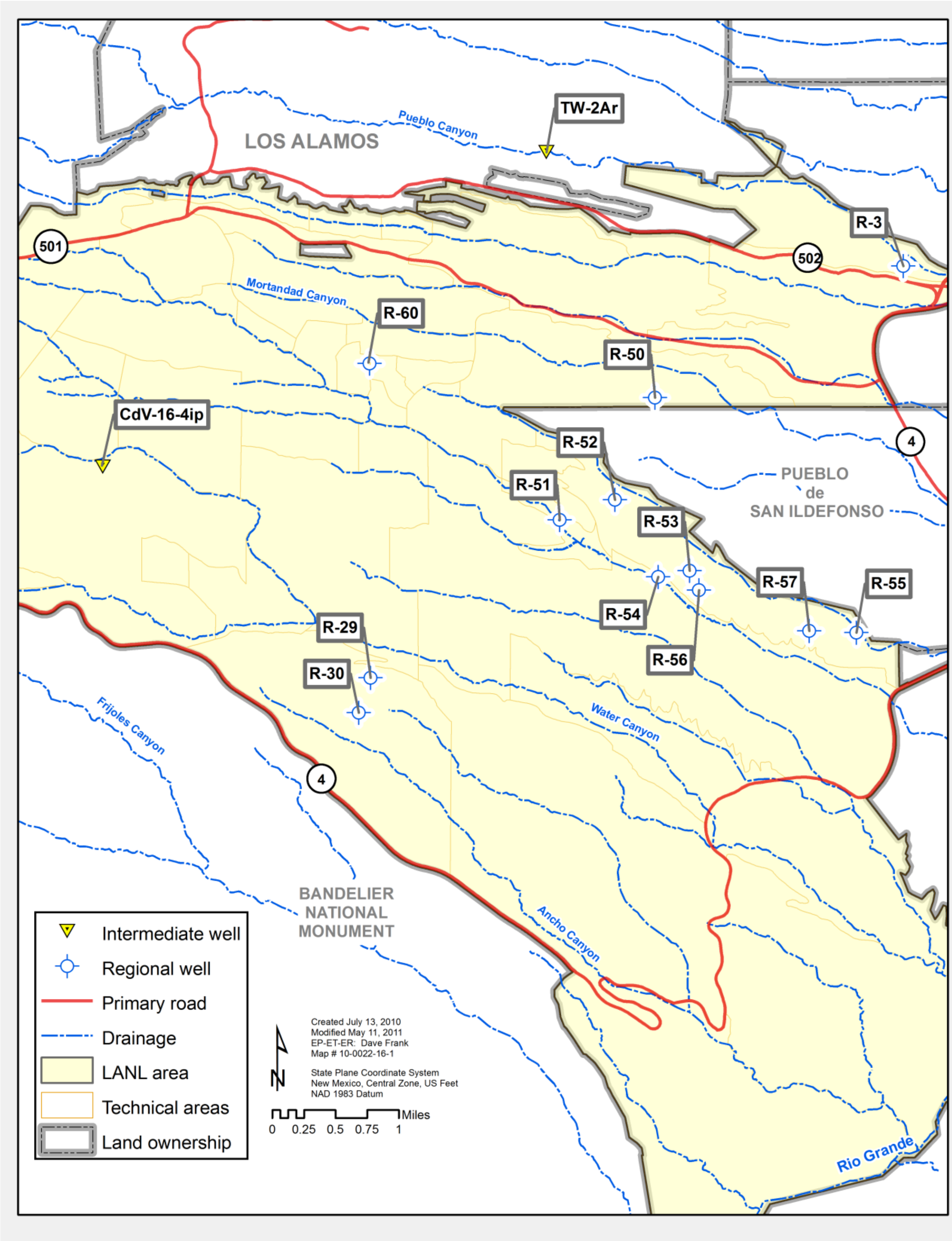

Figure 3-1. Map of wells and boreholes installed in 2010

3.9 Cultural Resources

LANL has a large and diverse number of historic properties. Approximately 88 percent of DOE-administered land in Los Alamos County has been surveyed for prehistoric and historic cultural resources. More than 1,800 prehistoric sites have been recorded (Table 3-25). During FY 2007, sites excavated since the 1950s were removed from the site count numbers, lowering LANL's number of recorded sites. Nearly 80 percent of these archaeological sites date from the 13th, 14th and 15th centuries. Most of the sites are situated in the piñon-juniper vegetation zone, with more than 68 percent lying between 5,800 and 7,100 feet in elevation. Sixty-two percent of all sites are found on mesa tops. Within LANL's limited access boundaries, there are ancestral villages, shrines, petroglyphs, sacred springs, trails, and traditional use areas that could be identified by Pueblo and Athabascan[3] communities as traditional cultural properties.

To date, LANL has identified no sites associated with the Spanish Colonial or Mexican periods. During FY 2004, the historic periods (Historic Pueblo, US Territorial, Statehood, and Undetermined Athabascan) were combined into one site affiliation code "Early Historic Pajarito Plateau" (AD 1500 to 1943). Many of the 2,319 potential historic cultural resources are temporary and modular properties, sheds, and utility features associated with the Manhattan Project and Cold War periods. Since the SWEIS was issued, these types of properties have been removed from the count of historic properties because they are exempt from review under the terms of the Programmatic Agreement dated June 2006 between the NNSA/Los Alamos Site Office (LASO), the New Mexico State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation. Additionally, LANL historians have evaluated many Manhattan Project and Early Cold War properties (AD 1942–1963) and those properties built after 1963 that potentially have historical significance, reducing the total number of potential historic cultural resource sites to 751 (Table 3-26). Most buildings built after 1963 are being evaluated on a case-by-case basis as projects arise that have the potential to impact the properties. Therefore, additional buildings may be added to the list of historic properties in the future.

LANL continues to evaluate buildings and structures from the Manhattan Project and the Early Cold War period (1943–1963) for eligibility to the National Register of Historic Places (NRHP).

[3] Athabascan refers to a linguistic group of North American Indians. Their range extends from Canada to the American Southwest, including the languages of the Navajo and Apache

Table 3-25. Acreage Surveyed, Prehistoric Cultural Resource Sites Recorded, and Cultural Resource Sites Eligible for the NRHP at LANL FY 2008, 2009 and 2010[a]

Fiscal Year	Total acreage surveyed by FY	Total acreage systematically surveyed to date	Total prehistoric cultural resource sites recorded to date (cumulative)	Total number of eligible & potentially eligible NRHP sites	Percentage of total site eligibility	Number of notifications to Indian Tribes[b]
2008	0	23,130	1,727[c]	1,625[c]	94	2
2009	52	23,046	1,745[c]	1,642[c]	94	3
2010	17.8	23,090[d]	1,748[c]	1,655[c]	94.6	6

a Source: Information on LANL provided by DOE/NNSA and LANL to the Secretary of Interior for a Report to Congress on Federal Archaeological Activities.

b As part of the SWEIS preparation, 23 tribes were consulted in a single notification. Subsequent years, however, show the number of separate projects for which tribal notifications were issued; the number of tribes notified is not indicated.

c As part of ongoing work to field verify sites recorded 20 to 25 years ago, LANL has identified sites that have been recorded more than once and have multiple Laboratory of Anthropology site numbers. Therefore, the number of recorded archaeological sites is less than indicated in FY 2002. This effort will continue over the next several years and more sites with duplicate records will likely be identified.

d Two tracts of land were conveyed to Los Alamos county during FY2010. Therefore, the total acres surveyed using the new DOE/NNSA boundary is 23,090. See Section 3.7.

Table 3-26. Historic Period Cultural Resource Properties at LANL[a]

Fiscal Year	Potential Properties[b]	Properties Recorded[c]	Eligible and Potentially Eligible Properties	Non-Eligible Properties	Percentage of Eligible Properties	Evaluated Buildings Demolished[d]
2008	758	623	346	277	55	144
2009	759	631	352	279	56	150
2010	751	646	364	282	56	170

a Source: Information on LANL provided by DOE/NNSA and LANL to the Secretary of Interior for a Report to Congress on Federal Archaeological Activities. Numbers given represent cumulative total properties identified, evaluated, or demolished by the end of the given FY.

b This number includes historic sites that have not been evaluated, and therefore, may be potentially NRHP-eligible. In addition, beginning with the CY 2002 Yearbook, historic properties that are exempt from review under the terms of the Programmatic Agreement were removed from these totals, substantially reducing the number of potential Historic period cultural resources.

c This represents both eligible and non-eligible sites.

d This represents the total number of evaluated buildings demolished to date.

LANL has recorded 142 historic sites. All have been given unique New Mexico Laboratory of Anthropology site numbers. Some of the 142 sites are experimental areas and artifact scatters dating from the Manhattan Project and Early Cold War periods.

The majority, 118 sites, are structures or artifact scatters associated with the Early Historic Pajarito Plateau or Homestead periods. Of these 142 sites, 100 are eligible for the NRHP. There are 609 Manhattan Project and Early Cold War period buildings.

Demolished Buildings. Table 3-27 indicates the extent of historic building documentation and demolition to date. To date, not all buildings that have been documented as part of the DD&D Program have been demolished.

Table 3-27. Historic Building Documentation and Demolition Numbers

Fiscal Year	Number of Buildings for which Documentation was Completed	Number of Buildings Actually Demolished in Fiscal Year
2008	4	6
2009	4	6
2010	**0**	**20**

3.9.1 Compliance Overview

Section 106 of the National Historic Preservation Act, Public Law 89-665, implemented by 36 Code of Federal Regulations Part 800 (36 CFR 800), requires federal agencies to evaluate the impact of proposed actions on historic properties. Federal agencies must also consult with the SHPO and/or the Advisory Council on Historic Preservation about possible adverse effects to NRHP-eligible resources.

During FY 2010[4], LANL evaluated 743 LANL-proposed actions, and conducted one new field survey to identify cultural resources. DOE/NNSA sent eleven survey reports to the SHPO for concurrence in findings of effects and determinations of eligibility for cultural resources located during survey projects. Additionally, one final report for the completion of data recovery stipulations was submitted to the SHPO.

The American Indian Religious Freedom Act of 1978 (Public Law 95-341) stipulates that it is federal policy to protect and preserve the right of American Indians to practice their traditional religions (42 USC 1996). Tribal groups must receive notification of possible alteration of traditional and sacred places. The Governors of San Ildefonso, Santa Clara, Cochiti, Jemez, and Acoma Pueblos and the President of the Mescalero Apache Tribe received copies of six reports to identify any traditional cultural properties that a proposed action could affect.

The Native American Graves Protection and Repatriation Act of 1990 (Public Law 101-601) states that if burials or cultural objects are inadvertently disturbed by federal

[4] All updates for the Cultural Resources section are reported on a FY basis, instead of CY. This is due to the fact that similar data is reported to Congress on a FY basis.

activities, work must stop in that location for 30 days, and the closest lineal descendant must be consulted for disposition of the remains (25 USC 1996). No discoveries of human remains occurred in FY 2010 from federal undertakings. However, human remains discovered during FY 2009, exposed by erosion within a power-line corridor, were stabilized and provided long-term protection measures during FY 2010.

The Archaeological Resources Protection Act of 1979 (Public Law 96-95) provides protection of cultural resources and sets penalties for their damage or removal from federal land without a permit (16 USC 1996). No violations of this Act were recorded on DOE/NNSA land in FY 2010.

3.9.2 Compliance Activities

Nake'muu. LANL completed its long-term monitoring program to assess the impact of LANL mission activities on cultural resources at the ancestral pueblo of Nake'muu as part of the *Dual-Axis Radiographic Hydrodynamic Test (DARHT) Facility Mitigation Action Plan* (DOE 1996h). Nake'muu is the only pueblo at LANL with standing walls. The site was occupied from circa AD 1200 to 1325 and contains 55 rooms with walls standing up to six feet high. During the nine-year monitoring program 1998–2006, the site witnessed a 0.9 percent displacement rate of chinking stones and 0.3 percent displacement of masonry blocks. Statistical analyses indicate that these displacement rates are significantly correlated with annual snowfall, but not with annual rainfall or explosive tests at the DARHT facility. The site is revisited annually and in 2008 the site experienced an unusually high percentage of new displaced masonry blocks. LANL is in the process of evaluating possible mitigation efforts. Representatives from the Pueblo of San Ildefonso visited Nake'muu on October 23, 2009.

Traditional Cultural Properties Comprehensive Plan. During FY 2010, LANL continued to assist DOE/NNSA in implementing the *Traditional Cultural Properties Comprehensive Plan* (LANL 2000). This included informal meetings with the Pueblos of San Ildefonso and Santa Clara. Discussions during the year centered around working with San Ildefonso regarding properties in TA-03, along with working with both San Ildefonso and Santa Clara regarding traditional cultural properties in Rendija Canyon. A Memorandum of Agreement was completed and signed in FY 2009.

Land Conveyance and Transfer. The Laboratory continued a multiyear program in support of the Land Conveyance and Transfer Project. Thirty-nine archaeological sites were excavated during 2002 to 2005, with more than 200,000 artifacts and 2,000 samples being recovered (LANL 2008d). During FY 2010 artifacts and records from the Land Conveyance and Transfer project were transferred for curation to Museum of Indian Arts and Culture, in Santa Fe. This work was conducted under a Programmatic Agreement amongst the DOE/NNSA, the Advisory Council on Historic Preservation, the New Mexico SHPO, and the Incorporated County of Los Alamos concerning the conveyance of certain parcels of land to the County for economic development. The DOE/NNSA continued the process of conveying and transferring DOE lands to Los Alamos County and the Pueblo of San Ildefonso.

Cerro Grande Fire Recovery. During 2009, LANL continued to monitor 34 Ancestral Pueblo and Archaic period archaeological sites rehabilitated by the Pueblo of San Ildefonso in CY 2004. The monitoring was in support of the *Mitigation Action Plan for the Special Environmental Analysis for the Cerro Grande Rehabilitation Project* (LANL 2010g). The monitoring is part of a long-term program to evaluate the success of erosion control measures and other aspects of rehabilitation. Based on recommendations made during the FY 2010 field season, three sites were removed from the monitoring plan as they have returned to pre-fire conditions. This leaves 15 sites and two traditional cultural property fences for continued monitoring in FY 2011.

3.9.3 Cultural Resources Management Plan

The Cultural Resources Management Plan (CRMP; LANL 2006) provides a set of guidelines for managing and protecting cultural resources, in accordance with requirements of the National Historic Preservation Act, the Archaeological Resources Protection Act, Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act, and other laws, regulations, and policies in the context of LANS' mission.

The CRMP provides high-level guidance for implementation of the *Traditional Cultural Properties Comprehensive Plan* and all other aspects of cultural resources management at LANL. It presents a framework for collaborating with Native American Tribes and other ethnic groups and organizations in identifying traditional cultural properties and sacred sites.

Status. The CRMP was finalized and approved by LANL and DOE/NNSA in 2005 and was implemented during 2006 through a Programmatic Agreement signed on June 15, 2006, by DOE/NNSA, the New Mexico SHPO, and the Advisory Council on Historic Preservation. The CRMP will be updated every five years. During FY 2010, implementing activities included the continued assessment of individual properties within the proposed Project Y Manhattan Project National Historic Landmark, as part of data gathering for use in developing the forthcoming landmark nomination package for the National Park Service. The degree of implementation of the plan in future years is contingent on funding.

3.10 Ecological Resources

LANL is located in a region of diverse landforms, elevation, and climate—features that contribute to producing diverse plant and animal communities. Plant communities range from urban and suburban areas to grasslands, wetlands, shrublands, woodlands, and mountain forest. These plant communities provide habitat for a variety of animal life.

The 2008 SWEIS projected no significant adverse impacts to biological resources, ecological processes, or biodiversity (including threatened and endangered species) resulting from LANL operations. Data collected for CY 2010 support this projection. These data are reported in the 2010 Environmental Report (LANL 2011c).

The SWEIS BA, completed in 2006, covers actions that were described in the 2008 SWEIS No Action Alternative and some actions that were included as part of the Expanded Operations Alternative. Actions included as part of the Expanded Operations Alternative include remediation of MDAs, DD&D of TA-21, and elimination or reduction of outfall releases in Mortandad Canyon and its tributaries. Other biological assessments are completed as needed.

LANL management approved a LANL Biological Resources Management Plan in September 2007 (LANL 2007a). LANL subject matter experts updated a source document for migratory bird protection BMPs in 2010 (LANL 2010h) and a source document for sensitive species protection in 2010 (LANL 2010i). These source documents are updated annually if new information is available.

3.10.1 Conditions of the Forests and Woodlands

The forests and woodlands in the LANL area have undergone significant changes that began with the 2000 Cerro Grande Fire that will have an impact on forest health for decades to come. The fire reduced tree densities in the area, particularly on Forest Service land west of LANL. Subsequent wildfire risk reduction thinning activities also reduced tree density and cover on much of the LANL forest and woodland. At the same time, the recent bark beetle infestation killed many of the remaining mature conifer trees throughout the Pajarito Plateau. LANL forests and woodlands are now more open and will continue to be dominated by understory species for many years.

In CY 2010, the Annual Wildland Fire Management Plan was implemented. The overall goals of the Wildland Fire Management Plan are to 1) protect the public, LANL workers, facilities, and the environment from catastrophic wildfire; 2) prevent interruptions of LANL operations from wildfire; 3) minimize impacts to cultural and natural resources while conducting fire management activities; 4) improve forest health and wildlife habitat at LANL and, indirectly, across the Pajarito Plateau; and promote and support interagency collaboration for wildfire-related activities. These goals are accomplished through reducing fuel loads within LANL forests to decrease wildfire hazards, treating fuel to decrease the risk of wildfire escapes at LANL-designated firing sites, and improving wildland fire suppression capability through fire road improvements.

LANL is located in a fire-prone region and there will always be a high potential for wildfires. Recent modeling of wildfire risks indicates that the greatest potential for lightning to ignite fires occurs along the western and southwestern boundary of LANL and in the adjacent mountainous areas. Because of this risk, thinning has been a primary management activity to reduce fire hazards in forests and woodlands at LANL.

3.10.2 Threatened and Endangered Species Habitat Management Plan

Under the Threatened and Endangered Species Habitat Management Plan (LANL 1998a), in CY 2010 LANL continued annual surveys for Mexican Spotted Owls and Southwestern Willow Flycatchers. Surveys were also conducted for two state-listed species, the Jemez Mountains salamander and the Gray Vireo. The Resources Management Team provided guidance for minimizing disturbance and habitat alteration impacts on federally listed species to projects and operations through excavation permit reviews and the permits and requirements identification process.

3.10.3 Biological Assessments and Compliance Packages

LANL subject matter experts prepare biological assessments for submission to the US Fish and Wildlife Service to review proposed activities and projects for potential impact on federally listed threatened or endangered species. These assessments are necessary when a project is not able to follow the existing guidelines in the Threatened and Endangered Species Habitat Management Plan. These assessments evaluate and document the amount of development or disturbance at proposed construction sites, and the amount of disturbance within designated core and buffer habitat. LANL subject matter experts also prepare floodplains assessments in accordance with 10 CFR 1022.

Floodplain or wetland assessments were completed for the following projects in CY 2010:

- Sandia Canyon Remediation (LANL 2010j)

During CY 2010, the Resources Management Team completed two biological assessments, to analyze impacts from the effluent reduction project and the cleanup of wetlands soil contamination in Sandia Canyon (LANL 2010k), and to analyze the impacts from the proposed ProForce facilities (LANL 2010l). The US Fish and Wildlife

Service concurred in the determination that the projects may affect, but were not likely to adversely affect, federally listed species for these assessments.

3.11 Footprint Elimination/Decontamination, Decommissioning, and Demolition

3.11.1 Footprint Elimination

Footprint reduction efforts funded by multiple programs contribute to the reduction of the LANL footprint as required to meet all related goals and mandates in place since 2006, and is a cornerstone facility strategy necessary to achieve the robust sustainable infrastructure required for current and future missions. The consolidation of people and functions into facilities that represent a better-built environment, coupled with the elimination of aged permanent and temporary structures, is the goal. This strategy allows the reduction of operational and maintenance costs of the eliminated facilities to more appropriately fund the remaining sustainable facilities. It also allows the associated deferred maintenance backlog and the energy/water usage of those same facilities to be avoided.

The institutionally funded Footprint Reduction Project is dedicated to forwarding specific facilities toward their ultimate elimination. These activities include

- funding the moves of functions/people to vacate a building,
- funding modifications in enduring facilities to house organizations that are vacating obsolete structures,
- addressing the specific institutional requirements necessary to formally declare a facility "excess" to maintain a backlog of structures ready for elimination once DD&D funding is acquired (approximately 0.75 million gross square feet), and in some cases, removing small structures.

In CY 2010, DOE/NNSA demolished 27 buildings and 28 trailers/transportables. In addition, 11 trailers were sold publicly by salvage, eliminating a total of 268,902 square feet of the Laboratory's footprint.

3.11.2 Decontamination, Decommissioning, and Demolition

DD&D are those actions taken at the end of the useful life of a building or structure to reduce or remove substances that pose a substantial hazard to human health or the environment, retire it from service, and ultimately eliminate all or a portion of the building or structure. When DOE/NNSA declares a LANL facility as surplus (no longer needed) it is shut down and prepared for DD&D. NEPA for DD&D activities at LANL are covered under the 2008 SWEIS, and all waste volumes generated from these activities are tracked in the SWEIS Yearbook. The 2008 SWEIS projected DD&D actions would produce large quantities of demolition debris, bulk LLW, and smaller quantities of TRU, mixed low-level, sanitary, asbestos, and hazardous wastes. Most waste is expected to be disposed of off-site.

In CY 2010, DOE/NNSA demolished 27 buildings and 28 trailers/transportables. Tables 3-28 and 3-29 summarize the waste volumes for all buildings that went through the DD&D process in CY 2010. In CY 2010, the last of 14 buildings at the historic DP West site a LANL's TA-21 were demolished. The demolition was funded by ARRA and is part of a larger pool of Recovery Act funds the Lab received for environmental remediation. DP West had a key role in the history of LANL, as the first plutonium processing facility in the world and as storage for finished weapons components for the nation's stockpile early in the Cold War. After the Cold War, DP West was used for high-end research for NASA space missions and nuclear energy research. ARRA funding was key in accelerating the process of cleanup for the site.

Table 3-28. CY 2010 DD&D Facilities Construction and Demolition Debris[a]

	Building Number	DD&D Completed	Waste Volumes (cubic meters)						
			Construction/ Demolition Debris	Asbestos[s]	Universal Waste	Recyclable Metal[e]	Recyclable Asphalt/ Concrete	Recyclable Wood	Equipment Salvaged[e]
	TA-03-0480	12/07/10	310	12	<1	5T	40	0	0
	TA-03-1559	07/02/10	150	3	<1	2T	30	0	0
	TA-03-1566	07/02/10	150	3	<1	2T	30	0	0
	TA-18-0119	07/20/10	0	0	<1	0	0	0	1.5T
	TA-18-0122	07/15/10	0	0	<1	0	0	0	1.5T
	TA-18-0138	07/18/10	0	0	<1	0	0	0	1.5T
	TA-18-0256	07/30/10	0	0	<1	0	0	0	1T
	TA-21-0155	05/26/10	1284	113	0	159	0	0	27
	TA-21-0209	12/21/10	650	0	0	674	0	0	0
	TA-21-0314	07/29/10	12	0	0	0	0	0	0
	TA-21-DPW[d]	2010	49	156	0	314	0	0	0
	TA-35-0256	08/28/10	60	0	<1	9T	0	0	0
	TA-35-0382	08/26/10	40	2	<1	4T	0	0	0
	TA-43-0039	03/31/10	30	375	4	300T	220	0	0
	TA-46-0185	09/01/10	20	2	<1	1T	0	0	0
	TA-48-0046	09/04/10	80	3	<1	1T	2.5	0	0
	TA-48-0047	09/04/10	80	4	<1	1T	2.5	0	0
	TA-52-0035	07/21/10	80	15	<1	5T	20	0	0
	TA-52-0036	07/21/10	80	15	<1	5T	20	0	0
	TA-52-0043	08/05/10	80	5	<1	5T	14	0	0
	TA-52-0105	08/05/10	32	0	<1	1T	1	0	0
	TA-52-0123	08/05/10	8	0	<1	1T	5	0	0
	TA-53-0401	08/25/10	120	2	<1	4T	15	0	0
	TA-53-0403	08/24/10	120	2	<1	4T	15	0	0
	TA-53-0409	08/23/10	120	2	<1	4T	15	0	0

	Building Number	DD&D Completed	Waste Volumes (cubic meters)						
			Construction/ Demolition Debris	Asbestos[s]	Universal Waste	Recyclable Metal[e]	Recyclable Asphalt/ Concrete	Recyclable Wood	Equipment Salvaged[e]
	TA-53-0456	09/01/10	80	.5	<1	2T	0	0	0
	TA-53-0514	09/01/10	40	.5	<1	3T	0	0	0
	TA-54-0281	09/30/10	31	0	0	76	0	0	0
	TA-63-0002	05/08/10	0	0	<1	0	0	0	5T
	TA-63-0004	04/30/10	150	<1	<1	2T	0	0	0
	TA-63-0077	04/30/10	0	<1	<1	2T	0	0	0
	TA-63-0078	04/29/10	0	<1	<1	2T	0	0	0
	TA-63-0093	04/29/10	0	<1	<1	2T	0	0	0
	TA-63-0113	05/01/10	150	<1	<1	2T	0	0	9.5T
	TA-63-0114	05/02/10	150	<1	<1	2T	0	0	0
	TA-69-0002	08/11/10	0	0	0	0	0	0	20T
	TA-69-0005	08/11/10	0	0	0	0	0	0	6T
2008 SWEIS			**246,409 m^3 [a]**						
TOTAL			**4,156**	**717[f]**	**5[f]**	**1,223[g]**	**430**	**0**	**27[g]**

a Construction/demolition debris included uncontaminated wastes such as steel, brick, concrete, pipe, and vegetative matter from land clearance. This number represents 151,382 cubic meters from the No Action Alternative, 2,293 cubic meters from the RLWTF upgrade, 2,133 cubic meters from the Plutonium Refurbishment, 35,934 cubic meters from the TA-21 DD&D Option, 12,998 cubic meters from the TA-18 DD&D Option, and 41,669 cubic meters from the Waste Management Facilities Transition.

b DD&D covered under existing environmental assessments are not included here.

c Asbestos volumes are tracked within the LANL waste database at TA-54.

d TA-21-DPW includes all waste produced from multiple buildings in the DP West area at TA-21.

e Certain waste volumes were only tracked in tons (not in cubic meters). These are designated with a T after the number.

f When totaled, waste data that included entries equal to <1 were considered to be equal to 1 when all added together.

g Total is only for waste recorded in cubic meters (not tons). Total of tons of Recyclable Metal = 371T. Total of tons of Equipment Salvaged = 46T.

Table 3-29. CY 2010 DD&D Facilities Chemical, LLW, MLLW, and TRU

	Building Number[b]	DD&D Completed	Waste Volumes			
			Chemical Waste[a]	LLW[b]	MLLW[b]	TRU[b]
	TA-21-0002	07/29/10	0	370	0	0
	TA-21-0003	07/29/10	0	318	0	0
	TA-21-0004	07/29/10	0	183	0	0
	TA-21-0005	11/04/10	0	835	0	0
	TA-21-0116	11/04/10	0	92	0	0
	TA-21-0149	11/04/10	0	396	0	0
	TA-21-0150	11/04/10	0	864	0	0
	TA-21-0152	09/30/10	0	2275	0	0
	TA-21-0155	05/26/10	0	1765	1.5	0
	TA-21-0209	12/21/10	0	369	0	0
	TA-21-0213	06/16/10	0	135	0	0
	TA-21-0312	06/30/10	0	162	0	0
	TA-21-0313	07/14/10	0	416	0	0
	TA-21-0314	07/29/10	0	587	0	0
	TA-21-0315	07/29/10	0	208	0	0
	TA-21-DPW	2010	0	1009	0	0
	TA-54-0216	06/15/10	0	163	0	0
	TA-54-0226	06/15/10	0	163	0	0
	TA-54-0281	09/30/10	0	53	0	0
2008 SWEIS			**1,417 10^3kg[ac]**	**91,891m^3[de]**	**649 m^3[f]**	**437 m^3[g]**
TOTAL			**0**	**10,363**	**1.5**	**0**

a Units = kilograms

b Units = cubic meters

c This number represents 837,781 from the No Action Alternative, 96,161 kg from the RLWTF Upgrade, 907 kg from the Plutonium Refurbishment, 34,019 kg from the TA-21 DD&D Option, 191,415 kg from the TA-18 DD&D Option, and 256,732 from the Waste Management Facilities Transition.

d LLW included bulk and packaged LLW.

e This number represents 29,588 m^3 from the No Action Alternative, 7,875 m^3 from the RLWTF Upgrade, 986 m^3 from the Plutonium Refurbishment, 26,453 m^3 from the TA-21 DD&D Option, 3,593 m^3 from the TA-18 DD&D Option, and 23,396 m^3 from the Waste Management Facilities Transition.

f This number represents 306 m^3 from the No Action Alternative, 115 m^3 from the RLWTF Upgrade, 168 m^3 from the Plutonium Refurbishment, 50 m^3 from the TA-21 DD&D Option, 4 m^3 from the TA-18 DD&D Option, and 6 m^3 from the Waste Management Facilities Transition.

g This number represents 176 m^3 from the RLWTF Upgrade, 260 m^3 from the Plutonium Refurbishment, 0.76 m^3 from the TA-21 DD&D Option

4.0 Summary and Conclusion

This Yearbook reviews CY 2010 operations for the 15 Key Facilities (as defined by the SWEIS) and Non-Key Facilities at LANL and compares those operations to levels projected by the RODs. The Yearbook also reviews the environmental effects associated with operations at the same 15 Key Facilities and the Non-Key Facilities and compares these data with ROD projections. In addition, the Yearbook presents a number of site-wide effects of those operations and environmental parameters.

The 2008 SWEIS No Action Alternative and approved elements of the Expanded Operations Alternative projected a total of 15 facility construction and modification projects within the Key Facilities. During 2010, seven construction/modification projects were undertaken. Electrical and mechanical systems were expanded to meet new computer requirements at the Nicholas C. Metropolis Center; construction of the Radiological Laboratory/Utility/Office Building continued at TA-55; the Nuclear Materials Safeguards and Security Upgrades Project continued at TA-55; the Ion Exchange Building (TA-03-2519) was brought online at Sigma Complex; a major upgrade to the heating ventilation system was started at the Radiochemistry Facility (TA-48-0001); the Waste Management and Risk Mitigation Facility (WMRM; TA-50-0250) at the Radioactive Liquid Waste Treatment Facility was placed into service; and demolition of the Tritium Science and Fabrication Facility (TSFF; TA-21-0209) and the Tritium Systems Test Assembly (TSTA; TA-21-0155) within the Tritium Facilities were completed. Within the Non-Key Facilities, two major construction projects were undertaken: The Pro Force Running Track was completed in 2010; and construction of the Tactical Training Facility at TA-16 was started in 2010.

In 2008, Pajarito Site (TA-18) was placed into Surveillance and Maintenance mode. Operations have ceased and the facility was downgraded to a Less-than-HazCat-3 Nuclear Facility. For the purpose of the 2008, 2009, and 2010 SWEIS Yearbooks, Pajarito Site and its nine capabilities have been removed as a Key Facility. In addition, the 2008 SWEIS recognized the Nicholas C. Metropolis Center (formerly known as the Strategic Computing Complex) as a new Key Facility because of the amounts of electricity and water it may consume.

During CY 2010, 82 capabilities were active and nine capabilities were inactive at LANL's Key and Non-Key Facilities. At CMR, Destructive and Nondestructive Analysis Project, Nonproliferation Training, and Large Vessel capabilities were not active. No High-Pressure Gas Fills and Processing, Diffusion and Membrane Purification, Hydrogen Isotopic Separation, or Radioactive Liquid Waste Treatment took place at the

Tritium Facilities. Materials Test Station equipment was not installed at the LANSCE. No Waste Retrieval at SRCW took place.

During 2010, five LANL facilities operated at levels approximating those projected in the SWEIS or beyond what was projected in the SWEIS—Bioscience, LANSCE, MSL, Radiochemistry, RLWTF, and the Non-Key Facilities. Bioscience and the MSL Key Facilities are more akin to the Non-Key Facilities and represent the dynamic nature of research and development at LANL; none of these facilities are major contributors to the parameters that lead to significant potential environmental impacts.

Radiochemistry Facilities exceeded operation level projections in the SWEIS; however, radioactive air emissions, outfall discharge, and waste quantities were below projections in the SWEIS.

LANSCE exceeded operation level projections in the SWEIS for the capability of treatment of radioactive liquid waste. Contributions of radioactive liquid waste received from the RLWTF and radioactive liquid waste from the TA-21 remediation work nearly doubled the amount projected in the SWEIS.

The RLWTF exceeded operation level projections in the SWEIS for the amount of evaporator bottoms shipped off site for a commercial facility. A cleanout campaign to treat and dispose of evaporator bottoms (residual actinides and impurities resulting from contaminated effluents filtered through an evaporator) was conducted in 2010. Disposal of the evaporator bottoms exceeded SWEIS projections for Low-Level Waste (LLW) generation at the RLWTF due to the five-year backlog of evaporator bottoms.

This Yearbook evaluates the effects of LANL operations in three general areas—effluent to the environment, workforce and regional consequences, and changes to environmental areas for which the DOE/NNSA has stewardship responsibility as the administrator of LANL.

Radioactive emissions have decreased significantly since 2007, after an emission control system at LANSCE was repaired. Radioactive airborne emissions from point sources (i.e., stacks) during 2010 totaled approximately 298 curies less than one percent of the 10-year average of 34,000[1] curies projected in the SWEIS.

[1] The projected radiological air emissions changed from the 10-year annual average of 21,700 curies in the 1999 SWEIS to 34,000 curies in the 2008 SWEIS. Annual radiological air emissions from 1999–2005 were used to project air emissions in the 2008 SWEIS. Emissions of activation products from LANSCE were much higher in those years due to a failure in one component of the emissions control system. The repair of the system in CY 2006 has significantly decreased emissions.

During 2010, emissions from criteria pollutants were well below both 2008 SWEIS projections and the New Mexico Administrative Code, Title 20, Chapter 2, Part 73.

Since 1999, the total number of permitted outfalls was reduced from 55 identified in the 1999 SWEIS to 15 that were renewed in the August 2007 National Pollutant Discharge Elimination System (NPDES) permit. As a result of these closures, there has been a significant decrease in flow. In addition to the decrease of the total number of permitted outfalls, the change in methodology by which flow was measured and reported in the past has had a significant impact on the flow volumes reported[2]. In 2010, 12 outfalls flowed. Calculated NPDES discharges totaled 141.8 million gallons for CY 2010 compared to a projected volume of 279.5 million gallons per year. This is approximately 8.5 million gallons more than the CY 2009 total of 133.3 million gallons. The 2010 total volume of discharge is well below the maximum flow of 279 million gallons that was projected in the SWEIS.

Water levels in wells penetrating into the regional aquifer continue to decline in response to pumping, typically by several feet each year. In areas where pumping has been reduced, water levels show some recovery. In 2010, LANL installed two monitoring wells (with three screens) in the perched intermediate groundwater zone and 12 monitoring wells (with 20 screens) in the regional aquifer.

Wastes have been generated at levels below quantities projected in the SWEIS. The 2008 SWEIS combines transuranic (TRU) and mixed TRU into one waste category since they are both managed for disposal at the Waste Isolation Pilot Plant. In 2010, waste quantities from LANL operations were below SWEIS projections for all waste types, reflecting the levels of operations at both the Key and Non-Key Facilities. Waste quantities at Key and Non-Key Facilities that exceeded the SWEIS levels were one-time, non-routine events.

In CY 2010, DOE/NNSA demolished 27 buildings and 28 trailers/transportables. In addition, 11 trailers were sold publicly by salvage, eliminating a total of 268,902 square feet of the Laboratory’s footprint.

In the 2008 SWEIS, actual utility impacts and performance changes were analyzed. Annual electricity and water usage from 1999–2005 remained well below the levels projected in the 1999 SWEIS. In the 2008 No Action Alternative, the total electric consumption and the total water consumption were reduced to a number closer to the average electric and water consumption for the six years analyzed. The electric

[2] Historically, instantaneous flow was measured during field visits as required in the NPDES permit. These measurements were then extrapolated over a 24-hour day/seven-day week. Since 2001, data are collected and reported using actual flows recorded by flow meters at all of the outfalls.

consumption for CY 2010 was 426 gigawatt-hours compared to the 582 gigawatt-hours projected in the SWEIS. Water consumption for CY 2010 was 413 million gallons, slightly less than the 418 million gallons projected in the SWEIS, and gas consumption for CY 2010 was 1.10 million decatherms, less than the 1.19 projected in the SWEIS. The Laboratory is committed to increasing energy efficiency and will continue to make improvements towards that goal in the future.

Radiological exposures to LANL workers are well within the levels projected in the SWEIS. The total effective dose equivalent for the LANL workforce was 125.4 person-rem during 2010, and is slightly higher than the 2009 dose of 116.8 person-rem but lower than the workforce dose of 280 person-rem projected in the 2008 SWEIS.

In the 2008 SWEIS No Action Alternative, the 2005 levels of employment were assumed to remain steady at 13,504. During 2006 and 2007, the size of the workforce slowly began to decrease. The 11,609 employees at the end of CY 2010 represent an increase of 164 employees (1.4%) as compared with the 11,445 total employees reported in the 2009 Yearbook.

Measured parameters for ecological resources and groundwater were similar to SWEIS projections, and measured parameters for cultural resources and land resources were below SWEIS projections. For land use, the SWEIS projected the disturbance of 41 acres of new land at TA-54 because of the need for additional disposal cells for low-level radioactive waste. (The 1999 SWEIS projected that 15 prehistoric sites would be affected by the expansion of Area G into Zones 4 and 6 at TA-54.) As of 2010, this expansion had not become necessary. Since 2001, approximately 2,440 acres of land have been transferred to the Department of Interior to be held in trust for the Pueblo of San Ildefonso or conveyed to Los Alamos County or the Los Alamos Public School Board. Tracts C-1 and A-13 were conveyed to Los Alamos County in 2010.

Ecological resources include biological resources such as protected sensitive species, ecological processes, and biodiversity. The recovery and response to the Cerro Grande Fire of May 2000 has included a wildfire fuels reduction program, burned area rehabilitation and monitoring efforts, and enhanced vegetation and wildlife monitoring. Cultural resources remained protected in CY 2010, and no excavation occurred of sites at TA-54 or anywhere else on LANL. Twenty historic buildings were demolished in FY 2010. Ecological and cultural resources remain stable in 2010.

In conclusion, LANL operations in CY 2010 have mostly fallen within SWEIS projections. Although operation levels for six LANL facilities exceeded the SWEIS operation projections, five of the six facilities did not exceed projections of air emissions, outfall discharge, waste, or other impact parameters; therefore, there is no potential for significant impact to the environment from operations of the Laboratory. The RLWTF exceeded SWEIS operation levels and exceeded the SWEIS projection for annual LLW generation; however, this exceedance was due to the disposal of a 5-year backlog of waste. In addition, waste quantities that exceeded the SWEIS levels were one-time, non-routine events that do not reflect the day-to-day operations of the Laboratory. No other impact parameters were exceeded. Overall, the operations data from 2010 indicate that LANL has been operating within the 2008 SWEIS projections and regulatory limits.

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References

Bhandari, D. 2011. "Impact of Los Alamos National Laboratory on the Economies of Northern New Mexico and the State as a Whole," University of New Mexico Bureau of Business and Economic Research, Albuquerque.

Department of Energy, 1995. "Environmental Assessment for Radioactive Source Recovery Program," DOE/EA-1059, and Finding of No Significant Impact. Los Alamos, NM.

Department of Energy, 1996a. "Categorical Exclusion for Footprint Reduction of Structures TA-16-242, -245, -367, -375, -376, -897, -898, -1407," LAN-96-010, Accession Number 14938, Los Alamos, NM.

Department of Energy, 1996b. "Categorical Exclusion for Footprint Reduction of Structures TA-16-243, -244, -246, -659, -660 and -661," LAN-96-010, Accession Number 14840, Los Alamos, NM.

Department of Energy, 1996c. "Categorical Exclusion for Gun Site Restoration Project - Phase 1," LAN-96-010, Accession Number 15077, Los Alamos, NM.

Department of Energy, 1996d. "Categorical Exclusion for TA-09-28 WFO Vehicle and Heavy Equipment Maintenance Facility," LAN-96-010, Accession Number 14917, Los Alamos, NM.

Department of Energy, 1996e. "Categorical Exclusion for TA-9-21 Lab Refurbishment," LAN-96-022, Accession Number 12985, Los Alamos, NM.

Department of Energy, 1996f. "Categorical Exclusion for TA-09-21 Electrical Infrastructure Safety Upgrades," LAN-96-012, Accession Number 13501, Los Alamos, NM.

Department of Energy, 1996g. "Categorical Exclusion for Destruction of PuBe Neutron Sources," LAN-96-103, Accession Number 6279, Los Alamos, NM.

Department of Energy, 1996h. "Dual Axis Radiographic Hydrodynamic Test Facility Final Environmental Impact Statement Mitigation Action Plan," DOE/EIS-0228.

Department of Energy, 1998a. "Environmental Assessment for the Proposed Strategic Computing Complex, Los Alamos National Laboratory, Los Alamos, New Mexico," DOE/EA-1250, Los Alamos, NM.

Department of Energy, 1998b. "Categorical Exclusion for Decontamination and Decommissioning of Vacant Structure," LAN-98-052, Accession No. 6137, Los Alamos, NM.

Department of Energy, 1999a. "Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory," US Department of Energy document DOE/EIS-0238, Albuquerque, NM.

Department of Energy, 1999b. "Record of Decision: Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory in the State of New Mexico," *Federal Register*, Volume 64, p 50797. Washington, DC. September 20, 1999.

Department of Energy, 1999c. "Categorical Exclusion for Changes to Radioactive Source Recovery Program," LAN-99-049, Accession Number 7405, Los Alamos, NM.

Department of Energy, 1999d. "Categorical Exclusion for Radioactive Source Storage at LANL," LAN-99-049, Rev. 1, Accession Number 7570, Los Alamos, NM.

Department of Energy, 1999e. "Final Environmental Impact Statement for the Conveyance and Transfer of Certain Land Tracts Administered by the U.S. Department of Energy and Located at Los Alamos National Laboratory, Los Alamos and Santa Fe Counties, New Mexico," DOE/EIS-0293, Albuquerque Operations Office.

Department of Energy, 2002a. "Safety Evaluation Report, Los Alamos National Laboratory Transportation Safety Document (TSD) Technical Safety Requirements (TSRs), LANL BUS-SA-002, R0," DOE National Nuclear Security Administration, Albuquerque Operations Office, Los Alamos Site Operations, Los Alamos, NM.

Department of Energy, 2002b. "Environmental Assessment for the D&D of TA-11 Drop Tower," DOE/EA-1407, Accession Number 14947, Los Alamos, NM.

Department of Energy, 2002c. "Environmental Assessment for the Proposed Construction and Operation of a Biosafety Level 3 Facility at Los Alamos National Laboratory, Los Alamos, NM," DOE/EA-1364, Accession Number 8250, Los Alamos, NM.

Department of Energy, 2002d. "Categorical Exclusion for the Ultracold Neutron Project at LANSCE," LAN-02-037, Accession No. 9004, Los Alamos, NM.

Department of Energy, 2003a. "Final Environmental Impact Statement for the Chemistry and Metallurgy Research Building Replacement Project at the Los Alamos National Laboratory," DOE/EIS-0350, Los Alamos, NM.

Department of Energy, 2003b. "Supplement Analysis to the 1999 Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory for the Proposed Disposition of Certain Large Containment Vessels," DOE/EIS-0238-SA-03, Los Alamos, NM.

Department of Energy, 2003c. "Environmental Assessment for the Detonator Storage Facility (WCM-3)," DOE/EA-1447, Accession Number 13902, Los Alamos, NM.

Department of Energy, 2004. "Record of Decision: Final Environmental Impact Statement for the Chemistry and Metallurgy Research Building Replacement Project at the Los Alamos National Laboratory," DOE/EIS-0350, Federal Register, Volume 69, p. 6967. Washington, D.C. July 9, 2000.

Department of Energy, 2005. "Supplement Analysis: Environmental Impact Statement for the Chemistry and Metallurgy Research Building Replacement (CMRR) Project at Los Alamos National Laboratory—Changes to the Location of the CMRR Facility Components," DOE/NNSA Los Alamos Site Office DOE/EIS-0350-SA-01.

Department of Energy, 2008a. "Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory," DOE/EIS-0380, Albuquerque, NM.

Department of Energy, 2008b. "Record of Decision: Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory in the State of New Mexico," *Federal Register*, Volume 73, p 55833. Washington, DC. September 26, 2008.

Department of Energy, 2008c. "Final Complex Transformation Supplemental Programmatic Environmental Impact Statement Summary," DOE/NNSA DOE/EIS-0236-S4, Washington, DC.

Department of Energy, 2009a. "Record of Decision: Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory in the State of New Mexico," *Document no. E9-16343*. Washington, DC. July 10, 2009.

Department of Energy, 2009b. "Supplement Analysis: Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory—Proposed Transport of Low Level Radioactive Waste by Truck and Rail from Los Alamos National Laboratory (LANL) for Disposal at EnergySolutions at Clive Utah," DOE/NNSA Los Alamos Site Office DOE/EIS-0380-SA-01.

Department of Energy, 2009c. "Approval to Resume Room 60/60A Transuranic Liquid Waste Treatment Operations", FO:19CK-219303, Los Alamos, NM.

Department of Energy, 2010a. "DOE List of Los Alamos National Laboratory Nuclear Facilities," DOE Albuquerque Operations Office Memorandum, Albuquerque, NM.

Department of Energy, 2010b. "Categorical Exclusion for Replacement of Los Alamos Neutron Science Center (LANSCE) Operational Equipment", LAN-11-0001, Accession No. 16587, Los Alamos, NM.

Department of Energy, 2010c. "Categorical Exclusion for a Photovoltaic Array Reuse of Los Alamos County Landfill", Accession No. 15241, LASO-10-001, Los Alamos, NM.

Department of Energy, 2010d. "Final Environmental Assessment for the Expansion of the Sanitary Effluent Reclamation Facility and Environmental Restoration of Reach S-2 of Sandia Canyon at Los Alamos National Laboratory," DOE/EA-1736, and "Finding of No Significant Impacts", Accession Number 14550, Los Alamos, NM.

Environmental Protection Agency, 2007. "Authorization to Discharge Under the National Pollutant Discharge Elimination System," NPDES Permit No. NM0028355.

Federal Register, 2001. "Nuclear Safety Management," US Department of Energy, 10 CFR 830, Vol. 66, No. 7, Washington, D.C.

Los Alamos National Laboratory, 1998a. "Threatened and Endangered Species Habitat Management Plan," Los Alamos National Laboratory report LA-CP-98-96, Los Alamos, NM.

Los Alamos National Laboratory, 2000. "A Comprehensive Plan for the Consideration of Traditional Cultural Properties and Sacred Sites at Los Alamos National Laboratory, New Mexico," Los Alamos National Laboratory document LA-UR-00-2400, Los Alamos, NM.

Los Alamos National Laboratory, 2001a. "CMR Replacement Project Preconceptual Design," ESH-ID 01-0194, Los Alamos, NM.

Los Alamos National Laboratory, 2001b. "Los Alamos National Laboratory Radiological Facilities List," Facility and Waste Operations Division, Office of Authorization Basis, FWO-OAB 403, Rev. 0, Los Alamos, NM.

Los Alamos National Laboratory, 2001c. "TA-55 Radiography/Interim," ESH-ID 01-0258, Los Alamos, NM.

Los Alamos National Laboratory, 2002a. "Los Alamos National Laboratory Radiological Facilities List," Performance Surety Division, Office of Authorization Basis, PS-OAB-403, Rev. 3, Los Alamos, NM.

Los Alamos National Laboratory, 2002b. "CMR Replacement Geotechnical Investigation," ESH-ID 02-0185, Los Alamos, NM.

Los Alamos National Laboratory, 2006. "A Plan for the Management of the Cultural Heritage at Los Alamos National Laboratory, New Mexico," Los Alamos National Laboratory report LA-UR-04-8964, Los Alamos, NM.

Los Alamos National Laboratory, 2007a. "Biological Resources Management Plan for Los Alamos National Laboratory," Los Alamos National Laboratory document LA-UR-07-2595, Los Alamos, NM.

Los Alamos National Laboratory, 2008a. "TA-3-39 Rm. 16 Phase II D&D," PR-ID 08P-0144, Los Alamos, NM.

Los Alamos National Laboratory, 2008b. "Los Alamos Science Complex," PR-ID 08P-0061, Los Alamos, NM.

Los Alamos National Laboratory, 2008c. "Materials Test Station," PR-ID 05P-0075 V1, Los Alamos, NM.

Los Alamos National Laboratory, 2008d. "The Land Conveyance and Transfer Data Recovery Project: 7000 Years of Land Use on the Pajarito Plateau," Los Alamos National Laboratory report LA-UR-07-6205, Los Alamos, NM.

Los Alamos National Laboratory, 2009a. "LANL Less than Hazard Category 3 Nuclear Facilities List." Safety Basis Division, Los Alamos, NM.

Los Alamos National Laboratory, 2010a. "TA-53-7 Substation Switchgear," PR-ID 10P-0195, Accession No. 16696, Los Alamos, NM.

Los Alamos National Laboratory, 2010b. "TA-53 LANSCE WNR Building," PR-ID 10P-0081, Accession No. 16590, Los Alamos, NM.

Los Alamos National Laboratory, 2010c. "TA-53 HVAC and Electrical Upgrades," PR-ID 10P-0121, Accession No. 16449, Los Alamos, NM.

Los Alamos National Laboratory, 2010d. "TA-53 Milling and Re-paving," PR-ID 10P-0145, Accession No. 16486, Los Alamos, NM.

Los Alamos National Laboratory, 2010e. "Excess Trailers and Transportable Disposition TA-53," PR-ID 10P-0014, Accession No. 16123, Los Alamos, NM.

Los Alamos National Laboratory, 2010f. "Investigation Work Plan for Lower Sandia Canyon Aggregate Plan," PR-ID 10P-0089, Accession No. 16253, Los Alamos, NM.

Los Alamos National Laboratory, 2010g. "FY 2010 2008 Site Wide Environmental Impact Statement Mitigation Action Plan Annual Report," Los Alamos National Laboratory report LA-UR-10-07245, Los Alamos, NM.

Los Alamos National Laboratory, 2010h. "Migratory Bird Best Management Practices Source Documents for Los Alamos National Laboratory, Revision 1," Los Alamos National Laboratory report LA-UR-07-8434, Los Alamos, NM.

Los Alamos National Laboratory, 2010i. "Sensitive Species Best Management Practices Source Document, Version 1," Los Alamos National Laboratory Report LA-UR-08-1464.

Los Alamos National Laboratory, 2010j. "Floodplain Assessment of Proposed Remediation and Effluent Discharge Actions in Sandia Canyon," Los Alamos National Laboratory Report LA-UR-10-03754.

Los Alamos National Laboratory, 2010k. "Biological Assessment of the Effects of Elimination of Effluent Outfalls and Cleanup of Wetland Soil Contamination in Sandia Canyon at Los Alamos National Laboratory," Los Alamos National Laboratory Report LA-CP-10-00833.

Los Alamos National Laboratory, 2010l. "Biological Assessment of the Effects of the Construction of Five Protective Force Training Facilities at Los Alamos National Laboratory," Los Alamos National Laboratory Report LA-CP-10-01807.

Los Alamos National Laboratory 2011a. "Radioactive Liquid Waste Treatment Facility Discharges in 2010", LA-UR-11-01632.

Los Alamos National Laboratory, 2011b. "2010 LANL Radionuclide Air Emissions," Los Alamos National Laboratory report LA-14441, Los Alamos, NM.

Los Alamos National Laboratory, 2011c. "Environmental Report 2010," Los Alamos National Laboratory report LA-14445-ENV, Los Alamos, NM.

Los Alamos National Laboratory, 2011d. "Emissions Inventory Report Summary for Los Alamos National Laboratory for Calendar Year 2010," Los Alamos National Laboratory report LA-UR-11-06646, Los Alamos, NM.

National Nuclear Security Administration, 2004. Memorandum from Ed Wilmot, Manager Los Alamos Site Office, to Carolyn Mangeng, Acting Associate Director for Technical Services, Los Alamos National Laboratory, Subject: Preparation of a *Supplemental Site-Wide Environmental Impact Statement for the Continued Operation of the Los Alamos National Laboratory (LANL), Los Alamos, New Mexico*. October 28, 2004.

National Nuclear Security Administration, 2005. Memorandum from Ed Wilmot, Manager Los Alamos Site Office, to Carolyn Mangeng, Acting Associate Director for Technical Services, Los Alamos National Laboratory, Subject: Preparation of a new *Site-Wide Environmental Impact Statement for the Continued Operation of the Los Alamos National Laboratory (LANL), Los Alamos, New Mexico*. Identification of Document Manager and Preparation Schedule. August 16, 2005.

Steele, C. M. 2002. "Transmittal of Approval of the Safety Evaluation Report (SER) for the Los Alamos National Laboratory (LANL) Transportation Safety Document (TSD) and Technical Safety Requirements (TSRs)," DOE National Nuclear Security Administration, Albuquerque Operations Office, Los Alamos Site Operations, SABT/RCJ.02.013: SABM Steele, Los Alamos, NM.

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Appendix A: Capability and Operations Tables for Key and Non-Key Facilities

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Table A- 1. CMR Building (TA-03)/Comparison of Operations

Capability	2008 SWEIS Projections	2010 Operations
Analytical Chemistry	Support actinide research and processing activities by processing approximately 7,000 samples/yr.	Analytical Chemistry received approximately 1800 samples during CY 2010 and conducted over 7,200 analytical processes involving microgram quantities of nuclear material.
Uranium Processing	Recover, process, and store LANL's highly enriched uranium inventory.	No activity to recover or process highly enriched uranium occurred in 2010. Some storage and inventory activities did take place.
Destructive and Nondestructive Analysis (Design Evaluation Project)	Evaluate up to 10 secondary assemblies/yr through destructive/nondestructive analyses and disassembly.	No activity in CY 2010. Project has not been active since 1999.
Nonproliferation Training	Conduct nonproliferation training using special nuclear material (SNM).	No nuclear measurement schools were conducted in CY 2010. This activity has been suspended indefinitely at the CMR.
Actinide Research and Development[a]	Characterize approximately 100 samples/yr using microstructural and chemical metallurgical analyses.	No microstructural/chemical analysis and compatibility testing of actinides were performed in CY 2010. Process activity was moved to TA-55 in 2007.
	Perform compatibility testing of actinides and other metals to study long-term aging and other material effects.	Activities continued in 2010.
	Analyze TRU waste disposal related to validation of WIPP performance assessment models.	Project was completed in 2001. No activity in CY 2010.
	Perform TRU waste characterization.	
	Analyze gas generation as could occur in TRU waste during transportation to WIPP.	

Capability	2008 SWEIS Projections	2010 Operations
Actinide Research and Development (continued)	Demonstrate actinide decontamination technology for soils and materials. Develop actinide precipitation method to reduce mixed wastes in LANL effluents. Process up to 400 kilograms of actinides/yr between TA-55 and the CMR building.	
Fabrication and Processing	Process up to 5,000 curies of neutron sources/yr (both plutonium-238 and beryllium and americium-241 and beryllium sources). Process neutron sources other than sealed sources. Stage a total of up to 1,000 plutonium-238 and beryllium and americium-241 and beryllium neutron sources in Wing 9 floor holes. Produce 1,320 targets/yr for isotope production. Separate fission products from irradiated targets. Support fabrication of metal shapes using highly enriched uranium (as well as related uranium processing activities) with an annual throughput of approximately 2,200 pounds (1,000 kilograms).	Project was terminated in CY 1999. No process activity in CY 2010. No process activity in 2010. Operations continued in 2010 in an effort to reduce the number of sources in Wing 9 floor holes. No process activity in 2010. No process activity in 2010. Casting furnace capability was removed in 1999. No enriched uranium solution processing was conducted in CY 2010.

Capability	2008 SWEIS Projections	2010 Operations
Large Vessel Handling[b]	Process up to two large vessels from the Dynamic Experiments Program annually.	No vessels processed in 2010.

a. The actinide activities at the CMR Building and at TA-55 are expected to total 400 kilograms/yr. The future split between these two facilities is not known, so the facility-specific impacts at each facility are conservatively analyzed at this maximum amount. Waste projections, which are not specific to the facility (but are related directly to the activities themselves), are only projected for the total of 400 kilograms/yr.

b. Currently referred to as the Containment Vessel Disposition Project.

Table A-2. CMR Building (TA-03)/Operations Data

Parameter	Units[a]	2008 SWEIS Projections	2010 Operations
Radioactive Air Emissions			
Total Actinides[b]	Ci/yr	7.60E-4	1.60E-5
Krypton-85	Ci/yr	1.00E+2	Not measured[c]
Xenon-131m	Ci/yr	4.50E+1	Not measured[c]
Xenon-133	Ci/yr	1.50E+3	Not measured[c]
NPDES Discharge			
03A021	MGY	1.9	0
Wastes			
Chemical	kg/yr	10,886	6,173.16
LLW	m^3/yr	1,835	633.67
MLLW	m^3/yr	19	0.64
TRU	m^3/yr	42[d]	2.91
Mixed TRU	m^3/yr	[d]	0.21

a. Ci/yr = curies per year; MGY = million gallons per year; kg/yr = kilograms per year; m^3/yr = cubic meters per year.

b. Includes plutonium -239

c. These radionuclides are not considered to be significant to off-site dose from this stack and do not require measurement under EPA regulations.

d. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-3. Sigma Complex (TA-03)/Comparison of Operations

Capability	2008 SWEIS Projections	2010 Operations
Research and Development on Materials Fabrication, Coating, Joining, and Processing	Fabricate items from metals, ceramics, salts, beryllium, enriched and depleted uranium, and other uranium isotope mixtures.	Capability maintained as projected.

Capability	2008 SWEIS Projections	2010 Operations
Characterization of Materials	Perform research and development on properties of ceramics, oxides, silicides, composites, and high-temperature materials.	Totals of 203 assignments and 976 specimens were characterized.
	Analyze up to 36 tritium reservoirs/yr.	Total of 12 tritium reservoirs analyzed in CY 2010.
	Develop a library of aged non-SNM material from stockpiled weapons and develop techniques to test and predict changes. Store and characterize up to 2,500 non-SNM component samples, including uranium.	Approximately 1,250 non-SNM materials samples and 1,250 non-SNM component samples stored in library.
Fabrication of Metallic and Ceramic Items	Fabricate stainless steel and beryllium components for up to 80 pits/yr.	Fabricated approximately 48 stainless steel and specialty alloy pit components.
	Fabricate up to 200 reservoirs for tritium/yr.	Fewer than 25 reservoirs fabricated.
	Fabricate components for up to 50 secondary assemblies/yr (of depleted uranium, depleted uranium alloy, enriched uranium, deuterium, and lithium).	Fabricated components for fewer than 50 secondary assemblies.
	Fabricate nonnuclear components for research and development: about 100 major hydrotests and 50 joint test assemblies/yr.	Fabricated components for fewer than 100 major hydrotests and for less than 50 joint test assemblies.
	Fabricate beryllium targets.	Provided material for the production of inertial confinement fusion targets and fabricated fewer than 10 targets.
	Fabricate targets and other components for accelerator production of tritium research.	On hold in 2010.
	Fabricate test storage containers for nuclear materials stabilization.	Produced approximately 20 containers.

Table A-4. Sigma Complex (TA-03)/Operations Data

Parameter	Units	2008 SWEIS Projections	2010 Operations
Radioactive Air Emissions[a]			
Uranium-234	Ci/yr	6.60E-5	Not measured[a]
Uranium-238	Ci/yr	1.80E-3	Not measured[a]
NPDES Discharge			
03A022	MGY	5.8	0.85
Wastes			
Chemical	kg/yr	9,979	7,112.99
LLW	m^3/yr	994	20.29
MLLW	m^3/yr	4	0.003
TRU	m^3/yr	0[b]	0
Mixed TRU	m^3/yr	0[b]	0

a. Emissions levels from this site are below EPA levels which require monitoring.
b. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-5. Machine Shops (TA-03)/Comparison of Operations

Capability	2008 SWEIS Projections	2010 Operations
Fabrication of Specialty Components	Provide fabrication support for the dynamic experiments program and explosives research studies. Support up to 100 hydrodynamic tests/yr. Manufacture up to 50 joint test assembly sets/yr. Provide general laboratory fabrication support as requested.	Specialty components were fabricated at levels below those projected in the 2008 SWEIS.
Fabrication Utilizing Unique Materials	Fabricate items using unique and unusual materials such as depleted uranium and lithium.	Fabrication with unique materials was conducted at levels below those projected in the 2008 SWEIS.
Dimensional Inspection of Fabricated Components	Perform dimensional inspection of finished components. Perform other types of measurements and inspections.	Dimensional inspection was provided for the above fabrication activities. Additional types of measurements and inspections were not undertaken.

Table A-6. Machine Shops (TA-03)/Operations Data

Parameter	Units	2008 SWEIS Projections	2010 Operations
Radioactive Air Emissions			
Uranium-238	Ci/yr	1.50E-04	4.07E-09
NPDES Discharge	MGY	No outfalls	No outfalls
Wastes			
Chemical	kg/yr	474,002	34,219.55
LLW	m^3/yr	604	4.95
MLLW	m^3/yr	0	0
TRU	m^3/yr	0[a]	0
Mixed TRU	m^3/yr	0[a]	0

a. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-7. Materials Science Laboratory (TA-03)/Comparison of Operations

Capability	2008 SWEIS Projections	2010 Operations
Materials Processing	Support development and improvement of technologies for materials formulation. Support development of chemical processing technologies, including recycling and reprocessing techniques to solve environmental problems.	Capability was maintained as projected in the SWEIS. Single crystal growth, amorphous alloy research, powder processing, and materials characterization were expanded in CY 2010. Cold mock up of weapons assembly and processing as well as other technologies continued to be expanded in CY 2010.
Mechanical Behavior in Extreme Environments	Study fundamental properties of materials and characterize their performance, including research on the ageing of weapons. Develop and improve techniques for these and other types of studies.	Capability was maintained as projected in the SWEIS and additional activities were continued to be expanded as projected in the SWEIS. Fabrication, assembly, and prototype experiments were expanded in CY 2010. Improvements were accomplished in the conduct of dynamic load and crack testing and measurement.

Capability	2008 SWEIS Projections	2010 Operations
Advanced Materials Development	Synthesize and characterize single crystals and nanophase and amorphous materials. Perform ceramics research, including solid-state, inorganic chemical studies involving materials synthesis. A substantial amount of effort in this area would be dedicated to producing new high-temperature superconducting materials. Provide facilities for synthesis and mechanical characterization of materials systems for bulk conductor applications. Develop and improve techniques for development of advanced materials.	Capability was maintained as projected and improved. Capability for ion beam modification of materials was increased. Superconductivity capability has been expanded to include electron beam deposition and performance measurement capabilities, including atomic force microscopy.
Materials Characterization	Perform materials characterization activities to support materials development.	Improvements occur on a continual basis, including expansion of electron microscopy to include atomic-scale microscopy and improvement of X-ray capabilities.

Table A-8. Materials Science Laboratory (TA-03)/Operations Data

Parameter	Units	2008 SWEIS Projections	2010 Operations
Radioactive Air Emissions	Ci/yr	Negligible	Not Measured[a]
NPDES Discharge	MGY	No outfalls	No outfalls
Wastes			
Chemical	kg/yr	590	232.42
LLW	m^3/yr	0	0
MLLW	m^3/yr	0	0
TRU	m^3/yr	0[a]	0
Mixed TRU	m^3/yr	0[a]	0

a. Emissions levels from this site are below EPA levels which require monitoring.
b. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-9. Metropolis Center (TA-03)/Comparison of Operations

Capability	2008 SWEIS Projections	2010 Operations
Computer Simulations	Perform complex three-dimensional computer simulations to estimate nuclear yield and ageing effects to demonstrate nuclear stockpile safety. Apply computing capability to solve other large-scale, complex problems.	As projected.

Table A-10. Metropolis Center (TA-03)/Operations Data[a]

Parameter	Units	2008 SWEIS Projections	2010 Operations
Radioactive Air Emissions	Ci/yr	Not projected[b]	Not measured[b]
NPDES Discharge			
03A-027	MGY	13.6	16.8[c]
Wastes			
Chemical	kg/yr	0	0
LLW	m^3/yr	0	0
MLLW	m^3/yr	0	0
TRU	m^3/yr	0[d]	0
Mixed TRU	m^3/yr	0[d]	0

a. The Metropolis Center became a Key Facility in the 2008 SWEIS. In earlier yearbooks it was part of the Non-Key Facility section.
b. No radiological operations occur at this site.
c. Outfall discharge amounts exceeded 2008 SWEIS projections. SERF expected to greatly reduce discharge amounts.
d. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-11. High-Explosives Processing (TA-08, TA-09, TA-11, TA-16, TA-22, and TA-37)/Comparison of Operations

Capability	2008 SWEIS Projections[a]	2010 Operations
High Explosives Synthesis and Production	Perform high-explosives synthesis and production research and development. Produce new materials for research, stockpile, security interest, and other applications. Formulate, process test, and evaluate explosives.	The high-explosives synthesis and production operations were below limits projected in the SWEIS.

Capability	2008 SWEIS Projections[a]	2010 Operations
High Explosives and Plastics Development and Characterization	Evaluate stockpile returns and materials of specific interest. Develop and characterize new plastics and high explosives for stockpile, military, and security interest improvements. Improve predictive capabilities. Research high-explosives waste treatment methods.	High-explosives formulation, synthesis, production, and characterization operations were performed at levels that were less than those projected in the SWEIS. Plastics research and development is currently being performed at other facilities.
High Explosives and Plastics Fabrication	Perform stockpile surveillance and process development. Supply parts to the Pantex Plant for surveillance and stockpile rebuilds and joint test assemblies. Fabricate materials for specific military, security interest, hydrodynamic, and environmental testing.	Fewer than 1,000 parts were fabricated in support of the weapons program in CY 2010, including high-explosives characterization studies, subcritical experiments, hydrotests, surveillance activities, environmental weapons tests, and safety tests. Plastics research and development is currently being performed at other facilities.
Test Device Assembly	Assemble test devices. Perform radiographic examination of assembled devices to support stockpile related hydrodynamic tests, joint test assemblies, environmental and safety tests, and research and development activities. Support up to 100 major hydrodynamic test device assemblies/yr.	W/WX Division provided fewer than 100 major assemblies for Nevada Test Site subcritical and joint environmental test programs.
Safety and Mechanical Testing	Conduct safety and environmental testing related to stockpile assurance and new materials development. Conduct up to 15 safety and mechanical tests/yr.	W/WX Division performed fewer than 15 stockpile related safety and mechanical tests during CY 2010.

Capability	2008 SWEIS Projections[a]	2010 Operations
Research, Development, and Fabrication of High-Power Detonators	Continue to support stockpile stewardship and management activities. Manufacture up to 40 major product lines/yr. Support DOE-wide packaging and transport of electro-explosive devices.	High-power detonator activities by WCM Division resulted in the manufacture of fewer than 40 product lines in CY 2010.

a. The total amount of explosives and mock explosives used across all activities is an indicator of overall activity levels for this Key Facility. Amounts projected in the SWEIS are 82,700 pounds of explosives and 2,910 pounds of mock explosives. Actual amounts used in CY 2010 were less than 2400 pounds of high explosive and less than 600 pounds of mock high explosives.

Table A-12. High-Explosives Processing (TA-08, TA-09, TA-11, TA-16, TA-22, and TA-37)/Operations Data

Parameter	Units	2008 SWEIS Projections	2010 Operations
Radioactive Air Emissions			
Uranium-238	Ci/yr	9.96E-7	Not measured[a]
Uranium-235	Ci/yr	1.89E-8	Not measured[a]
Uranium-234	Ci/yr	3.71E-7	Not measured[a]
NPDES Discharge			
Number of outfalls			
Total Discharges	MGY	0.06	0.000048
03A-130 (TA-11)	MGY	[a]	0.000048
05A-055 (TA-16)	MGY	[a]	0
Wastes			
Chemical	kg/yr	13,154	3,876.46
LLW	m^3/yr	15	14.04
MLLW	m^3/yr	<1	0
TRU	m^3/yr	0[b]	0
Mixed TRU	m^3/yr	0[b]	0

a. LANS does not measure these non-point (diffuse) emissions at their source ; rather LANS uses ambient air measurements at public receptor locations to evaluate compliance from diffuse emissions.

b. The 2008 SWEIS did not calculate individual flow per outfall.

c. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-13. High-Explosives Testing (TA-14, TA-15, TA-36, TA-39, and TA-40)/Comparison of Operations

Capability	SWEIS Projections	2010 Operations
Hydrodynamic Tests	Develop containment technology. Conduct baseline and code development tests of weapons configuration. Conduct 100 major hydrodynamic test/yr.	3 hydrodynamic tests in 2010
Dynamic Experiments	Conduct dynamic experiments to study properties and enhance understanding of the basic physics and equation of state and motion for nuclear weapons materials, including some SNM experiments.	Dynamic experiments for 2010 were conducted below 2008 SWEIS projected levels
Explosives Research and Testing	Conduct tests to characterize explosive materials.	Explosives research and testing experiments for 2010 were conducted below 2008 SWEIS projected levels
Munitions Experiments	Support the U.S. Department of Defense with research and development of conventional munitions. Conduct experiments to study external-stimuli effects on munitions.	Munitions experiments for 2010 were conducted below 2008 SWEIS projected levels
High-Explosives Pulsed-Power Experiments	Conduct experiments using explosively driven electromagnetic power systems.	HE Pulsed Power experiments for 2010 were conducted below 2008 SWEIS projected levels
Calibration, Development, and Maintenance Testing	Perform experiments to develop and improve techniques to prepare for more involved tests.	Calibration, Development and Maintenance testing 2010 were conducted below 2008 SWEIS projected levels
Other Explosives Testing	Conduct advanced high-explosives or weapons evaluation studies.	Other explosives testing for 2010 were conducted below 2008 SWEIS projected levels

Table A-14. High-Explosives Testing (TA-14, TA-15, TA-36, TA-39, and TA-40)/Operations Data

Parameter	Units	2008 SWEIS Projections	2010 Operations
Radioactive Air Emissions			
Depleted Uranium[a]	Ci/yr	1.5E-1	Not measured[b]
Uranium-234	Ci/yr	3.4E-2	Not measured[b]
Uranium-235	Ci/yr	1.5E-3	Not measured[b]
Uranium-238	Ci/yr	1.4E-1	Not measured[b]
Chemical Usage[c]			
Aluminum[c]	kg/yr	45,450	217.1
Beryllium	kg/yr	90	1.6
Copper[c]	kg/yr	45,630	8.6
Depleted Uranium	kg/yr	3,130[d]	30.5
Lead	kg/yr	240	0
Tantalum	kg/yr	300	0.0012
Tungsten	kg/yr	300	0
NPDES Discharge			
03A–185 (TA-15)	MGY	2.2	0.54
Wastes			
Chemical	kg/yr	35,380	54,534.82[e]
LLW	m^3/yr	918	337.94
MLLW	m^3/yr	8	0
TRU[f]	m^3/yr	<1[f]	0
Mixed TRU	m^3/yr	[f]	0

a. The isotopic composition of depleted uranium is approximately 72 percent uranium-238, approximately 1 percent uranium-235, and approximately 27 percent uranium-234. Because there are no historic measurements of emissions from these sites, projections are based on estimated release fractions of the materials used in tests.

b. LANS does not measure these non-point (diffuse) emissions at their source ; rather LANS uses ambient air measurements at public receptor locations to evaluate compliance from diffuse emissions.

c. Usage listed for the SWEIS includes projections for expanded operations at DARHT as well as the other TA-15 firing sites (the highest foreseeable level of such activities that could be supported by the LANL infrastructure). No proposals are currently before DOE to exceed the material expenditures at DARHT evaluated in the DARHT environmental impact statement (DOE 1995).

d. The quantities of copper and aluminum involved in these tests are used primarily in the construction of support structures. These structures are not expended in the explosive tests, and thus, do not contribute to air emissions.

e. Chemical waste generation exceeded 2008 SWEIS projections due to the removal of approximately 40,000 kg of industrial wastewater that needed to be pumped because of a broken waterline, overflow of potable cooling tower water and the flushing of the new fire protection system at TA-15-0312.

f. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-15. Tritium Facilities Comparison of Operations

Capability	2008 SWEIS Projections	2010 Operations
High-Pressure Gas Fills and Processing	Handle and process tritium gas in quantities of about 100 grams approximately 65 times/yr.	No high-pressure gas fills/processing operations were performed in 2010.
Gas Boost System Testing and Development	Conduct gas boost system research and development and testing and gas processing operations approximately 35 times/yr using quantities of about 100 grams of tritium.	Gas boost tests within SWEIS projections were performed in 2010.
Diffusion and Membrane Purification	Conduct research on gaseous tritium movement and penetration through materials—perform up to 100 major experiments/yr. Use this capability for effluent treatment.	No diffusion and membrane research was performed in 2010.
Metallurgical and Material Research	Conduct metallurgical and materials research and applications studies and tritium effects and properties research and development. Small amounts of tritium would be used for these studies.	Activities were conducted within SWEIS projections in 2010.
Gas Analysis	Measure the composition and quantities of gases (in support of tritium operations).	Gas analysis operations were continued within SWEIS projections during 2010.
Calorimetry	Perform calorimetry measurements in support of tritium operations.	Calorimetry activities were conducted within SWEIS projections during 2010.
Solid Material and Container Storage	Store about 1,000 grams of tritium inventory in process systems and samples, inventory for use, and waste.	Inventory was stored and maintained within SWEIS projections in 2010
Hydrogen Isotopic Separation	Perform research and development of tritium gas purification and processing in quantities of about 200 grams of tritium per test.	No separations were performed in 2010.
Radioactive Liquid Waste Treatment: TA-21	Pre-treat liquid LLW at TA-21 prior to transport for treatment. Activity ends with decommissioning of TA-21 tritium buildings.	TSFF and TSTA were placed in surveillance mode in 2008 and demolished in 2010. No activity[a]

a. TSFF and TSTA were put into Surveillance and Maintenance Mode in 2008 and demolished in 2010.

Table A-16. Tritium Facilities (TA-16)/Operations Data

Parameter	Units	2008 SWEIS	2010 Operations
Radioactive Air Emissions			
TA-16/WETF, Elemental tritium	Ci/yr	3.00E+2	6.11E+01
TA-16/WETF, Tritium in water vapor	Ci/yr	5.00E+2	4.17+01
NPDES Discharge			
02A-129 (TA-21)	MGY	17.4	0[a]
Wastes			
Chemical	kg/yr	1,724	403.70
LLW	m^3/yr	482	16.16
MLLW	m^3/yr	3	0
TRU	m^3/yr	0[b]	0
Mixed TRU	m^3/yr	0[b]	0

a. TA-21 facilities were DD&Ded and so this outfall had no flow in CY 2010.
b. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-17. Target Fabrication Facility (TA-35)/Comparison of Operations

Capability	2008 SWEIS Projections	2010 Operations
Precision Machining and Target Fabrication	Provide targets and specialized components for approximately 12,400 laser and physics tests/yr. Perform approximately 100 high-energy-density physics tests/yr. Analyze up to 36 tritium reservoirs/yr.	Provided targets and specialized components for about 30 tests. Provided components to HX and P divisions for high-energy-density physics tests. Did not support high-explosive pulsed-power tests at levels identified in the SWEIS.
Polymer Synthesis	Produce polymers for targets and specialized components for approximately 12,400 laser and physics tests/yr. Perform approximately 100 high-energy-density physics tests/yr.	Produced polymers for targets and specialized components for about 100 tests. Did not support high-explosive pulsed-power tests or high-energy-density physics tests at levels identified in the SWEIS.
Chemical and Physical Vapor Deposition	Coat targets and specialized components for about 12,400 laser and physics tests/yr. Support approximately 100 high-energy-density physics tests/yr. Support plutonium pit rebuild operations.	Coated targets and specialized components for about 40 tests. Did not support high-explosive pulsed-power tests or high-energy-density physics tests at levels identified in the SWEIS.

Table A-18. Target Fabrication Facility (TA-35)/Operations Data

Parameter	Units	2008 SWEIS	2010 Operations
Radioactive Air Emissions	Ci/yr	Negligible	Not Measured[a]
NPDES Discharge	MGY	No outfalls	No outfalls
Wastes			
Chemical	kg/yr	3,810	390.47
LLW	m^3/yr	10	0
MLLW	m^3/yr	<1	0
TRU	m^3/yr	0[b]	0
Mixed TRU	m^3/yr	0[b]	0

a. Emissions levels from this site are below EPA levels which require monitoring.
b. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-19. Bioscience Key Facilities/Comparison of Operations

Capabilities	SWEIS ROD	2010 Operations (FTEs)[a]
Biologically Inspired Materials and Chemistry	Determine formation and structure of biomaterials for bioenergy. Synthesize biomaterials. Characterize biomaterials.	7 FTEs
Cell Biology	Study stress-induced effects and responses on cells. Study host-pathogen interactions. Determine effects of beryllium exposure.	5 FTEs
Computational Biology	Collect, organize, and-manage information on biological systems. Develop computational theory to analyze and model biological systems.	20 FTEs Number and types of WFO programs are increasing.
Environmental Microbiology	Study microbial diversity in the environment, Collect and analyze environmental samples. Study biomechanical and genetic processes in microbial systems.	14 FTEs
Genomic Studies	Analyze genes of living organisms such as humans, animals, microbes, viruses, plants, and fungi.	28 FTEs Decrease in DOE support, growth in WFO.
Genomic and Proteomic Science	Develop and implement high-throughput tools. Perform genomic and proteomic analysis. Study pathogenic and nonpathogenic systems.	14 FTEs Steady level of effort.

Capabilities	SWEIS ROD	2010 Operations (FTEs)[a]
Measurement Science and Diagnostics	Develop and use spectroscopic tools to study molecules and molecular systems. Perform genomic, proteomic, and metabolomic studies.	12 FTEs Slight decrease in activity.
Molecular Synthesis and Isotope Applications	Synthesize molecules and materials. Perform spectroscopic characterization of molecules and materials. Develop new molecules that incorporate stable isotopes. Develop chem-bio sensors and assay procedures. Synthesize polymers and develop applications for them. Utilize stable isotopes in quantum computing systems.	11 FTEs Steady level of effort..
Structural Biology	Research three·dimensional structure and dynamics of macromolecules and complexes. Use various spectroscopy techniques. Perform neutron scattering. Perform X-ray scattering and diffraction.	10 FTEs Slight decrease in activity.
Pathogenesis	Perform genome-scale, focused, and computationally enhanced experimental studies on pathogenic organisms.	4 FTEs
Biothreat Reduction and Bioforensics	Analyze samples for biodefense and national security purposes. Identify pathogen strain signatures using DNA sequencing and other molecular approaches.	17 FTEs Steady level of effort.
InVivo Monitoring[b].	Performs whole-body scans as a service to the LANL personnel monitoring program, which supports operations with radioactive materials conducted elsewhere at LANL.	3 FTEs In CY 2010, the IVML conducted 1056 lung and whole body client counts and 828 other counts (detector studies, quality assurance, etc.).

a. FTEs: full-time-equivalent scientists, researchers, and other staff supporting a particular research capability.
b. This is not a Bioscience Division capability; however, it is located at TA-43-HRL-1. Therefore, it is a capability within this Key Facility and is included here.

Table A-20. Bioscience Facilities/Operations Data

Parameter	Units	2008 SWEIS	2010 Operations
Radioactive Air Emissions	Ci/yr	Not estimated	Not measured[a]
NPDES Discharge		No outfalls	No outfalls
Wastes			
Chemical	kg/yr	13,154	127,923.40[b]
LLW	m^3/yr	34	0
MLLW	m^3/yr	3	0.19
TRU	m^3/yr	0[c]	0
Mixed TRU	m^3/yr	0[c]	0

a. No radiological operations occur at this site.
b. Chemical waste generation exceeded 2008 SWEIS projections due to a re-roofing project of TA-43-0001.
c. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-21. Radiochemistry Facility (TA-48)/Comparison of Operations

Capability	2008 SWEIS Projections	2010 Operations
Radionuclide Transport Studies	Conduct 80 to 160 actinide transport, sorption, and bacterial interaction studies/yr. Develop models for evaluation of groundwater. Assess performance of risk of release for radionuclide sources at proposed waste disposal sites.	During CY 2010, operations continued at approximately twice the levels identified in the SWEIS.
Environmental Remediation Support	Conduct background contamination characterization pilot studies. Conduct performance assessments, soil remediation research and development, and field support. Support environmental remediation activities.	During CY 2010, operations continued at approximately half the levels identified in the SWEIS.
Ultra-Low-Level Measurements	Perform chemical isotope separation and mass spectrometry at current levels.	Level of operations decreased during 2010.
Nuclear and Radiochemistry Separations	Conduct radiochemical operations involving quantities of alpha-, beta-, and gamma-emitting radionuclides at current levels for non-weapons and weapons work.	Decrease in quantities of alpha-emitting radionuclides used in operations.

Capability	2008 SWEIS Projections	2010 Operations
Isotope Production	Conduct target preparation, irradiation, and processing to recover medical and industrial application isotopes to support approximately 150 offsite shipments/yr.	Slightly increased level of operations over 2009, but approximately the same as levels identified in the SWEIS.
Actinide and TRU Chemistry	Perform radiochemical operations involving alpha-emitting radionuclides.	Slightly increased level of operations, but approximately the same as levels identified in the SWEIS.
Data Analysis	Re-examine archive data and measure nuclear process parameters of interest to weapons radiochemists.	Below levels projected in the SWEIS.
Inorganic Chemistry	Conduct synthesis, catalysis, and actinide chemistry activities: Conduct chemical synthesis of organo-metallic complexes Conduct structural and reactivity analysis, organic product analysis, and reactivity and mechanistic studies Conduct synthesis of new ligands for radiopharmaceuticals Conduct environmental technology development activities: Ligand design and synthesis for selective extraction of metals Soil washing Membrane separator development Ultrafiltration	Below levels projected in the SWEIS. CY 2010: Approximately the same level of operations as 2009.
Structural Analysis	Perform synthesis and structural analysis of actinide complexes at current levels. Conduct X-ray diffraction analysis of powders and single crystals.	Below levels projected in the SWEIS.
Sample Counting	Measure the quantity of radioactivity in samples using alpha-, beta-, and gamma-ray counting systems.	During CY 2010, sample processing was expanded.
Hydrotest Sample Analysis	Measure beryllium contamination from simulated nuclear weapons hydrotesting.	Capability active in CY 2010.

Table A-22. Radiochemistry Facility (TA-48)/Operations Data

Parameter	Units	2008 SWEIS Projections	2010 Operations
Radioactive Air Emissions			
Mixed Fission Products[a]	Ci/yr	1.5E-4	Not measured[a]
Plutonium-239	Ci/yr	1.2E-5	None detected[b]
Uranium--235	Ci/yr	4.8E-7	None detected[b]
Arsenic-72	Ci/yr	1.2E-4	None detected[b]
Arsenic-73	Ci/yr	2.5E-3	None detected[b]
Arsenic-74	Ci/yr	1.3E-3	1.02E-6
Beryllium-7	Ci/yr	1.6E-5	None detected[b]
Bromine-77	Ci/yr	9.3E-4	1.92E-4
Germanium-68[c]	Ci/yr	8.9E-3	5.04E-3
Rubidium-86	Ci/yr	3.0E-7	None detected[b]
Selenium-75	Ci/yr	3.8E-4	1.04E-4
Other Activation Products[d]	Ci/yr	5.5E-6	2.85E-05 Ci Hg-197m
NPDES Discharge		No outfalls	No outfalls
Wastes			
Chemical	kg/yr	3,311	2,422.90
LLW	m^3/yr	268	24.56
MLLW	m^3/yr	4	0.17
TRU	m^3/yr	0[e]	0
Mixed TRU	m^3/yr	0[e]	0

a. Emission categories of 'mixed fission products' and 'mixed activation products' are no longer used. Instead, where fission or activation products are measured, they are reported as specific radionuclides, e.g., cesium-137 or cobalt-60.

b. Although stack sampling systems were in place to measure these emissions, any emissions were sufficiently small to be below the detection capabilities of the sampling systems.

c. Germanium-68 was assumed to be in equilibrium with gallium-68.

d. Other Activation Products are a mixed group of activation products represented by strontium-90 and yttrium-90 in equilibrium.

e. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-23. Radioactive Liquid Waste Treatment Facility (TA-50)/ Comparison of Operations

Capability	2008 SWEIS Projections	2010 Operations
Waste Transport, Receipt, and Acceptance	Collect radioactive liquid waste from generators and transport it to the RLWTF at TA-50.	As projected.
	Support, certify, and audit generator characterization programs.	As projected.
	Maintain the waste acceptance criteria for the RLWTF.	As projected.
	Send approximately 250,000 liters of evaporator bottoms to an offsite commercial facility for solidification/yr. (Approximately 20 m^3 of solidified evaporator bottoms would be returned/yr for disposal as LLW at TA-54 Area G.)	390,000 liters of evaporator bottoms were shipped during 2010. No solidified bottoms were returned for disposal at Area G[a.]
	Transport annually to TA-54 for storage or disposal: 250 m^3 of LLW 2 m^3 of mixed LLW 10 m^3 of TRU waste 400 kg of hazardous waste	Transported to Area G for storage or disposal: 81 m^3 of LLW zero m^3 of mixed LLW 7.7 m^3 TRU waste 83 kg of hazardous waste
Radioactive Liquid Waste Treatment	Pretreat 110,000 liters/yr of liquid TRU waste.	23,000 liters of transuranic RLW were treated.
	Solidify, characterize, and package 12 m^3/yr of TRU waste sludge.	8.5 m^3 (41 drums) of cemented sludge were created.
	Treat 15 million liters/yr of liquid LLW.	Processed 3.1 million liters of liquid LLW.
	Dewater, characterize, and package 50 m^3/yr of LLW sludge.	No LLW sludge was treated during 2010.
	Process 1 million liters/yr of secondary liquid waste generated by the RLWTF treatment processes through the RLWTF evaporator.	Processed 870,000 liters through the evaporator.
	Discharge treated liquids through an NPDES outfall.	Discharged 3.1 million liters in 2010.

a. Exceeded SWEIS projections due to a campaign to treat and dispose of evaporator bottoms. This was the first treatment of evaporator bottoms since February 2005, a result of budgetary restrictions.

Table A-24. Radioactive Liquid Waste Treatment Facility (TA-50)/ Operations Data

Parameter	Units	2008 SWEIS Projections	2010 Operations
Radioactive Air Emissions			
Americium-241	Ci/yr	Negligible	3.79E-09
Plutonium-238	Ci/yr	Negligible	None detected
Plutonium-239	Ci/yr	Negligible	None detected
Thorium-228	Ci/yr	Negligible	4.85E-08
Thorium-230	Ci/yr	Negligible	None detected
Thorium-232	Ci/yr	Negligible	None detected
Uranium-238	Ci/yr	Negligible	7.91E-08
NPDES Discharge			
051	MGY	4.0	0.57088
Wastes			
Chemical	kg/yr	399	372.04
LLW	m^3/yr	252	1,244.62[a]
MLLW	m^3/yr	2	0.02
TRU	m^3/yr	10[b]	0
Mixed TRU	m^3/yr	[a]	4.16

a. Low-Level Waste generation exceeded SWEIS projections due to a campaign to treat and dispose of evaporator bottoms. This was the first treatment of evaporator bottoms since February 2005, a result of budgetary restrictions.
b. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-25. Los Alamos Neutron Science Center (TA-53)/ Comparison of Operations

Capability	2008 SWEIS Projections	2010 Operations
Accelerator Beam Delivery, Maintenance, and Development	Operate 800-million-electron-volt linac beam and deliver beam to Areas A, B, C, WNR facility, Manuel Lujan Center, Dynamic Test Facility, and Isotope Production Facility for 10 months/yr (6,400 hrs). The H+ beam current would be 1,250 microamps; the H- beam current would be 200 microamps.	In 2010, H+ beam was delivered to the Isotope Production Facility for 3,660 of 4,165 scheduled hours at an average current of 214.8 microamperes with 87.9% reliability. H- beam was delivered as follows: (a) to the Lujan Center for 2,868 of 3,390 scheduled hours at an average current of 99.9 microamperes with 84.6% total availability; (b) to WNR Target 2 for 441 of 499 scheduled hours in a "pulse on demand" mode of operation with 88.4% total availability; (c) to WNR Target 4 for 3,635 of 3041 scheduled hours at an average current of 1.5 microamperes with 86.7% total availability; (d) through Line X to Line B (ultracold neutron) for 1,625 of 1,800 scheduled hours in a "pulse on demand" mode of operation with 90.3% total availability; (e) through Line X to Line C (pRad) for 766 of 821 scheduled hours in a "pulse on Accelerator Beam Delivery, Maintenance, and Development demand" mode of operation with 93.4% total availability.
	Reconfigure beam delivery and support equipment to support new facilities, upgrades, and experiments.	No major upgrades to the beam delivery complex.
Experimental Area Support	Provide support to ensure availability of the beam lines, beam line components, handling and transport systems, and shielding, as well as radio-frequency power sources.	Support activities were conducted per the projections of the SWEIS.
	Perform remote handling and packaging of radioactive material, as needed.	Remote handling and packaging was performed at IPF.

Capability	2008 SWEIS Projections	2010 Operations
Neutron Research and Technology[a]	Conduct 1,000 to 2,000 experiments/yr using neutrons from the Lujan Center and WNR facility. Support contained weapons-related experiments using small to moderate quantities of high explosives, including: - Approximately 200 experiments/yr using nonhazardous materials and small quantities of high explosives - Approximately 60 experiments/yr using up to 4.5 kilograms of high explosives and depleted uranium - Approximately 80 experiments/yr using small quantities of actinides, high explosives, and sources - Shock wave experiments involving small amounts, up to nominally 50 grams of plutonium - Support for static stockpile surveillance technology research and development.	302 experiments were conducted at the Lujan Center and 87 experiments at WNR. No dynamic experiments were conducted at WNR in 2010.
Materials Test Station	Irradiate materials and fuels in a fast-neutron spectrum and in a prototype temperature and coolant environment.	No activity
Subatomic Physics Research	Conduct 5 to 10 physics experiments/yr at Manuel Lujan Center and WNR facility.	Conducted 4 experiments at Manuel Lujan Center and 1 experiment at WNR in 2010.

Capability	2008 SWEIS Projections	2010 Operations
Subatomic Physics Research (continued)	Conduct up to 100 proton radiography experiments, including using small to moderate quantities of high explosives, including: Dynamic experiments in containment vessels with up to 4.5 kilograms of high explosives and 45 kilograms of depleted uranium. Dynamic experiments in powder launcher with up to 300 grams of gun powder. Contained experiments using small to moderate quantities of high explosives similar to those discussed under Neutron Research and Technology.[a]	30 high-explosive experiments were conducted in 2010.
	Conduct 2 to 4 active interrogation experiments per year at Line C. Proton interrogation using up to 19 kg of 20% enriched uranium. Pion production and captive measurements.	Conducted 1 experiment in CY 2010 involving uranium targets and 1 experiment for captive measurement of pions.
	Conduct research using ultracold neutrons; operate up to 10 microamperes/yr of negative beam current.	During CY 2010 Ultracold Neutron Research focused on accelerator data gathering during the entire run cycle.
Medical Isotope Production	Irradiate up to 120 targets/yr for medical isotope production at the Isotope Production Facility.	A total of 52 targets were irradiated in 2010 (32 Rubidium Chloride targets for Sr-82; 17 Gallium targets for Ge-68 production; 1 Aluminum target for Na-22 production; 1 Sodium Bromide target for Se-72; 1 Germanium target for As-73).
High-Power Microwaves and Advanced Accelerators	Conduct research and development in high-power microwaves and advanced accelerators in areas including microwave research for industrial and environmental applications.	Research and development were conducted.

Capability	2008 SWEIS Projections	2010 Operations
Radioactive Liquid Waste Treatment (Solar Evaporation at TA-53)	Treat about 520,000 liters/yr of radioactive liquid waste.	The TA-53 RLWTF received 978,900 (192,600 from TA-53 and 786,300 from other sites) liters of radioactive liquid waste into its holding tanks and discharged 966,400 liters into the evaporation tanks during CY 2010[b].

a. High explosives and quantities used under the Neutron Research and Technology capability include up to 10 pounds of high explosives and/or depleted uranium, small quantities of actinides and sources, and up to 50 grams of plutonium.

b. Radioactive liquid waste treatment amounts exceeded 2008 SWEIS projections due to the contributions of radioactive liquid waste received from RLWTF and from the TA-21 remediation work.

Table A-26. Los Alamos Neutron Science Center (TA-53)/Operations Data

Parameter	Units	2008 SWEIS Projections	2010 Operations
Radioactive Air Emissions			
Argon-41	Ci/yr	8.87E+2	1.75E+01
Particulate & Vapor Activation	Ci/yr	Not projected[a]	5.58E-03
Products			
Carbon-10	Ci/yr	2.65E+0	3.79E-01
Carbon-11	Ci/yr	2.25E+4	1.16E+02
Nitrogen-13	Ci/yr	3.10E+3	3.04E+01
Oxygen-15	Ci/yr	3.88E+3	4.54E+01
Tritium as Water	Ci/yr	Not projected[a]	2.34E+01
NPDES Discharge			
Total Discharges	MGY	28.2	17.9
03A-048	MGY	Not projected[b]	17.4
03A-113	MGY	Not projected[b]	0.45
Wastes			
Chemical	kg/yr	16,783	807.15
LLW	m^3/yr	1,070	352.42
MLLW	m^3/yr	1	0.05
TRU	m^3/yr	0[c]	0
Mixed TRU	m^3/yr	0[c]	0

a. The radionuclide was not projected in the SWEIS because it was either dosimetrically insignificant or not isotopically identified.

b. The 2008 SWEIS did not calculate individual flow per outfall.

c. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-27. Solid Radioactive and Chemical Waste Facilities (TA-50 and TA-54)/Comparison of Operations

Capability	2008 SWEIS Projections	2010 Operations
Waste Characterization, Packaging, and Labeling	Support, certify, and audit generator characterization programs.	As projected.
	Maintain waste acceptance criteria for LANL waste management facilities.	As projected.
	Characterize 420 cubic meters of newly generated TRU waste.	Characterized 132 cubic meters in CY 2010.
	Characterize 8,400 cubic meters of legacy TRU waste.	Characterized approximately 704 cubic meters of TRU waste in CY 2010.
	Characterize additional LLW, MLLW, and chemical waste, including waste from DD&D and remediation activities	Characterized 18 cubic meters of MLLW from environmental remediation activities in CY 2010.
	Characterize approximately 2,400 cubic meters of contact-handled and 100 cubic meters of remote handled legacy TRU waste retrieved from belowground storage.	No activity in CY 2010.
	Maintain waste acceptance criteria for offsite treatment, storage, and disposal facilities.	As projected.
	Overpack and bulk small waste, as required.	As projected.
	Perform coring and visual inspection of a percentage of TRU waste packages.	Performed visual examinations on 102 TRU waste packages in CY 2010; no drums were cored in 2010.
	Ventilate TRU waste retrieved from belowground storage.	No activity.
	Maintain WIPP waste acceptance criteria compliance and liaison with WIPP operations.	As projected.
Waste Transport, Receipt, and Acceptance	Collect chemical and mixed wastes from LANL generators and transport to Consolidated Remote Storage Sites and TA-54.	Collected and transported chemical and mixed wastes.
	Ship 320 cubic meters/yr of newly generated TRU waste to WIPP.	Shipped 62 cubic meters of newly generated TRU waste to WIPP in CY 2010.

Capability	2008 SWEIS Projections	2010 Operations
Waste Transport, Receipt, and Acceptance (continued)	Ship 8,400 cubic meters/yr of legacy TRU waste to WIPP.	Shipments to WIPP began 3/26/1999.
	Ship approximately 2,340 cubic meters of contact-handled and 100 cubic meters of remote-handled legacy TRU waste to WIPP	No activity in CY 2010.
	Ship 55 cubic meters of MLLW for offsite treatment and disposal in accordance with EPA land disposal restrictions.	Approximately 29 cubic meters of MLLW were shipped for offsite treatment and disposal from the Solid Radioactive and Chemical Waste Facility in CY 2010.
	Ship LLW to offsite disposal facilities.	As projected.
	Ship 6,400 metric tons of chemical wastes for offsite treatment and disposal in accordance with EPA land disposal restrictions.	Approximately 3,243 metric tons of chemical waste was shipped for offsite treatment and disposal from the Solid Radioactive and Chemical Waste Facility.
	Ship LLW, MLLW, and chemical waste from DD&D and remediation activities.	As projected.
	Ship additional LLW, MLLW, and chemical waste from DD&D and remediation activities.	As projected.
	Receive, on average, 5 to 10 shipments/yr of LLW and TRU waste from offsite locations.	No LLW was received from any offsite locations.
Waste Storage	Stage chemical and mixed wastes before shipment for offsite treatment, storage, and disposal.	Chemical and mixed wastes were staged before shipment.
	Store TRU waste until it is shipped to WIPP.	As projected.
	Store MLLW pending shipment to a treatment facility.	As projected.
	Store LLW uranium chips until sufficient quantities are accumulated for stabilization campaigns.	No uranium chips were stored for stabilization in CY 2010.
	Store TRU waste generated by DD&D and remediation activities.	No TRU generated from DD&D and remediation activities in CY 2010.
	Manage and store sealed sources for the OSRP.	As projected.
	Increase types and quantities of sealed sources for the OSRP.	As projected

Capability	2008 SWEIS Projections	2010 Operations
Waste Retrieval	Retrieve remaining legacy TRU waste 2,400 cubic meters of contact-handled and 100 cubic meters of remote-handled from belowground storage in TA-54 Area G, including: Pit 9, above Pit 29, Trenches A-D, and Shafts 200-232, 235-243, 246-253, 262-266, and 302-306.	No retrieval occurred in 2010.
Waste Treatment	Demonstrate treatment (e.g., electrochemical) of liquid MLLW.	No activity.
	Compact up to 2,540 cubic meters/yr of LLW.	79 cubic meters of LLW was compacted in 2010.
	Process 2,400 cubic meters of TRU waste through size reduction at the Decontamination and Volume Reduction System (DVRS).	No waste was processed at the DVRS.
	Process newly generated TRU waste through new TRU Waste Facility.	No activity.
	Stabilize 870 cubic meters of uranium chips.	No activity.
Waste Disposal	Dispose 84 cubic meters of LLW in shafts, 23,000 cubic meters of LLW in pits, and small quantities of radioactively contaminated polychlorinated biphenyls in shafts in Area G/yr.	Approximately 22 cubic meters of LLW were disposed of in shafts at Area G in 2010.
	Dispose additional LLW generated by DD&D and remediation activities.	No activity for CY 2010
	Migrate operations in Area G to Zones 4 and 6, as necessary, to allow continued onsite disposal of LLW.	No activity.
Decontamination Operations	Decontaminate approximately 700 personnel respirators and 300 air-proportional probes for reuse per month.	In 2010, decontaminated approximately 1,000 personnel respirators and no faces and 40 bodies at TA-54-1009.
	Decontaminate vehicles and portable instruments for reuse (as required).	No activity in 2010.
	Decontaminate precious metals for resale using an acid bath.	No activity in 2010.
	Decontaminate scrap metals for resale by sandblasting the metals.	No activity in 2010.

Capability	2008 SWEIS Projections	2010 Operations
Decontamination Operations (continued)	Decontaminate 200 cubic meters of lead for reuse by grit blasting.	No activity in 2010.

a. Includes the construction of four new storage domes for the TWISP.

Table A-28. Solid Radioactive and Chemical Waste Facilities (TA-54 and TA-50)/Operations Data

Parameter	Units	2008 SWEIS Projections	2010 Operations
Radioactive Air Emissions[a]			
Tritium	Ci/yr	6.09E+1	Not monitored [a]
Americium-241	Ci/yr	2.87E-6	3.35E-10 [a]
Plutonium-238	Ci/yr	2.24E-5	1.20E-08 [a]
Plutonium-239	Ci/yr	8.46E-6	7.30-E-10 [a]
Uranium-234	Ci/yr	8.00E-6	None detected [a]
Uranium-235	Ci/yr	4.10E-7	None detected [a]
Uranium-238	Ci/yr	4.00E-6	9.89E-10 [a]
Other Radionuclides	Ci/yr	Negligible	2.83E-09
NPDES Discharge	MGY	No outfalls	No outfalls
Wastes[b]			
Chemical	kg/yr	907	3185.28[c]
LLW	m^3/yr	229	72.36
MLLW	m^3/yr	8	6.66
TRU	m^3/yr	27[d]	2.99
Mixed TRU	m^3/yr	[d]	1.46

a. Data shown are measured emissions from WCRR Facility and the ARTIC Facility at TA-50, and Building 412 and Dome 231 at TA-54. The two TA-54 stacks were monitored starting in 2010. No other stacks require monitoring at TA-54. All non-point sources at TA-50 and TA-54 are measured using ambient monitoring.

b. Secondary wastes are generated during the treatment, storage, and disposal of chemical and radioactive wastes. Examples include repackaging wastes from the visual inspection of TRU waste, HEPA filters, personnel protective clothing and equipment, and process wastes from size reduction and compaction.

c. Chemical waste generation exceeded 2008 SWEIS projections due to the disposal of 1,380 kg of soil/asphalt that resulted from a repaving project, and 1,248 kg of latex paint.

d. 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-29. Plutonium Complex Facility/Comparison of Operations

Capability	2008 SWEIS Projections	2010 Operations
Plutonium Stabilization	Recover, process, and store existing plutonium inventory.	Highest priority items have been stabilized. The implementation plan has been modified between DOE and the Defense Nuclear Facilities Safety Board.
Manufacturing Plutonium Components	Produce nominally 20 plutonium pits/yr.	Fewer than 20 qualified pits were produced in CY 2010.
	Fabricate parts and samples for research and development activities, including parts for dynamic and subcritical experiments.	Research and development of plutonium materials continued.
Surveillance and Disassembly of Weapons Components	Disassemble, survey, and examine up to 65 plutonium pits/yr.	Fewer than 65 pits were disassembled during CY 2010. Fewer than 40 pits were destructively examined as part of the stockpile evaluation program (pit surveillance) in CY 2010.
Actinide Materials Science and Processing Research and Development	Perform plutonium (and other actinide) materials research, including metallurgical and other characterization of samples and measurements of mechanical and physical properties.	Research and development of plutonium (and other actinide) materials continued.
	Operate the 40-millimeter Impact Test Facility and other test apparatus.	The 40-millimeter Impact Test Facility was operated.
	Develop expanded disassembly capacity and disassemble up to 200 pits/yr.	Fewer than 200 pits were disassembled/converted in CY 2010. Fewer than 12 pits were processed through tritium separation in CY 2010.
	Process up to 5,000 curies of neutron sources (including plutonium and beryllium and americium-241 and beryllium).	Neutron sources were not processed in CY 2010.
	Process neutron sources other than sealed sources.	Continued processing neutron sources other than sealed sources are not processed.

Capability	2008 SWEIS Projections	2010 Operations
Actinide Materials Science and Processing Research and Development (continued)	Process up to 400 kilograms/yr of actinides between TA-55 and the CMR Building.[a]	Fewer than 400 kilograms of actinides were processed in CY 2010.
	Process pits through the Special Recovery Line (tritium separation).	Continued processing of pits through the Special Recovery Line.
	Perform oralloy decontamination of 28 to 48 uranium components per month.	In CY 2010, fewer than 48 uranium components were decontaminated per month.
	Conduct research in support of DOE actinide cleanup activities and on actinide processing and waste activities at DOE sites.	Research supporting DOE actinide cleanup activities continued at low levels.
	Fabricate and study nuclear fuels used in terrestrial and space reactors.	The DOE/Office of Nuclear Energy Advanced Fuel Cycle and Mixed Oxide Fuel Initiative is fabricating actinide nitride fuels for irradiation in a reactor environment.
	Fabricate and study prototype fuel for lead test assemblies.	The DOE/Office of Nuclear Energy Advanced Fuel Cycle and Mixed Oxide Fuel Initiative is fabricating actinide nitride fuels for irradiation in a reactor environment.
	Develop safeguards instrumentation for plutonium assay.	Continued support of safeguards instrumentation development during CY 2010.
	Analyze samples.	Analysis of actinide samples at TA-55 continued in CY 2010 in support of actinide reprocessing and research and development activities.
Fabrication of Ceramic-Based Reactor Fuels	Make prototype mixed oxide (MOX) fuel.	Research and development activities occurred in CY 2010.
	Build test reactor fuel assemblies.	No assembly or fabrication of fuel assemblies were conducted in CY 2009.
	Continue research and development on other fuels.	Research and development activities occurred in CY 2010.

Capability	2008 SWEIS Projections	2010 Operations
Plutonium-238 Research, Development, and Applications	Process, evaluate, and test up to 25 kilograms/yr plutonium-238 in production of materials and parts to support space and terrestrial uses.	Less than 25 kilograms of plutonium-238 were processed, evaluated, and/or tested in CY 2010.
	Recover, recycle and blend up to 18 kilograms/yr plutonium-238.	Less than 18 kilograms of plutonium-238 were recovered, recycled and blended in CY 2010.
Storage, Shipping, and Receiving	Provide interim storage of up to 6.6 metric tons of the LANL SNM inventory, mainly plutonium.	SNM storage, shipping, and receiving continue to be performed at the Plutonium Facility (Building 55-4).
	Store working inventory in the vault in Building 55-4; ship and receive SNM as needed to support LANL activities.	Building 55-4 vault levels remained approximately constant at levels identified during preparation of the SWEIS.
	Provide temporary storage of Security Category I and II materials removed in support of TA-18 closure, pending shipment to the Nevada Test Site and other DOE Complex locations.	Continued temporary storage for TA-18 Category I and II material.
	Store sealed sources collected under DOE's OSRP.	Continued temporary storage of OSRP sources.
	Store MOX fuel rods and fuel rods containing archive and scrap metals from MOX fuel lead assembly fabrication.	Continued storage of MOX fuel rods until a shipping container is available to transport the material to another DOE site where the fuel rods will be evaluated.

a. The actinide activities at the CMR Building and at TA-55 are expected to total 400 kilograms/yr. The future split between these two facilities was not known, so the facility-specific impacts at each facility were conservatively analyzed at this maximum amount. Waste projections that are not specific to the facility (but are related directly to the activities themselves) are only projected for the total of 400 kilograms/yr.

Table A-30. Plutonium Complex Facility/Operations Data

Parameter	Units	2008 SWEIS Projections	2010 Operations
Radioactive Air Emissions			
Plutonium-239[a]	Ci/yr	1.95E-5	1.85E-09
Tritium in Water Vapor	Ci/yr	7.50E+2	6.22E+00
Tritium as a Gas	Ci/yr	2.50E+2	9.94E+00
NPDES Discharge			
03A–181	MGY	4.1	1.04
Wastes			
Chemical	kg/yr	8,618	11,843.32[b]
LLW	m^3/yr	757	162.94
MLLW	m^3/yr	15	21.37[c]
TRU	m^3/yr	336[d]	49.41
Mixed TRU	m^3/yr	[d]	50.44

a. Projections for the SWEIS were reported as plutonium or plutonium-239, the primary material at TA-55.

b. Chemical waste generated exceeded the SWEIS projection due to a molecular sieve desiccant that had been stored in TA- 55-0268 for an extended period of time. This building is not environmentally controlled, e.g. humidity and temperature, to store the desiccant and the desiccant no longer met the mission specification. Therefore it was disposed of.

c. Mixed Low-Level waste generated exceeded the 2008 SWEIS projection due to disposal of an old glove box that no longer met the mission needs or specifications.

d. The 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-31. Operations at the Non-Key Facilities

Capability	Examples
Theory, modeling, and high-performance computing.	Modeling of atmospheric and oceanic currents. Theoretical research in areas such as plasma and beam physics, fluid dynamics, and superconducting materials.
Experimental science and engineering.	Experiments in nuclear and particle physics, astrophysics, chemistry, and accelerator technology. Also includes laser and pulsed-power experiments (e.g., Atlas).
Advanced and nuclear materials research and development and applications	Research and development into physical and chemical behavior in a variety of environments; development of measurement and evaluation technologies.
Waste management	Management of municipal solid wastes. Sewage treatment. Recycle programs.
Infrastructure and central services	Human resources activities. Management of utilities (natural gas, water, electricity). Public interface.
Maintenance and refurbishment	Painting and repair of buildings. Maintenance of roads and parking lots. Erecting and demolishing support structures.
Management of environmental, ecological, and cultural resources	Research into, assessment of, and management of plants, animals, historic properties, and environmental media (groundwater, air, surface waters).

Table A-32. Non-Key Facilities/Operations Data

Parameter	Units	2008 SWEIS	2010 Operations
Radioactive Air Emissions[a]			
Tritium	Ci/y	9.1E+2	None measured
Plutonium	Ci/y	3.3E-6	None measured
Uranium	Ci/y	1.8E-4	None measured
NPDES Discharge			
Total Discharges	MGY	200.9	95.4
001	MGY	[b]	[c]
013	MGY	[b]	95.0[c]
03A-160	MGY	28.5	0.019
03A-199	MGY	[b]	9.16
Wastes			
Chemical	kg/yr	651,000	1,142,531.06[d]
LLW	m^3/yr	1,529	174.03
MLLW	m^3/yr	31	71.84[f]
TRU	m^3/yr	23[e]	3.46
Mixed TRU	m^3/yr	[e]	0

a. Stack emissions from previously active facilities (TA-33 and TA-41); these stacks have been shut down. Does not include non-point sources.

b. The 2008 SWEIS did not calculate individual flow per outfall. Three outfalls in Sandia Canyon are projected to discharge 172.4 MGY.

c. Discharge totals for Outfalls 001 and 013 have been combined.

d. Chemical waste generation at the Non-Key Facilities exceeded the SWEIS projections due primarily to the start of the DD&D of the former Administrative Building (TA-03-0043).

e. The 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

f. Mixed Low-Level Waste generation at the Non-Key Facilities exceeded the SWEIS projections due to a legacy waste clean out in order for the FOD to bring TA-03-0016 into compliance and a cold and dark (pre-D&D) status.

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Appendix B: Chemical Usage and Estimated Emissions Data

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Key Facility	Chemical Name	CAS Number	Units	2010 Usage	2010 Estimated Air Emissions
CMR Building	Acetone	67-64-1	kg/yr	9.48	3.32
CMR Building	Ammonium Chloride (Fume)	12125-02-9	kg/yr	0.75	0.26
CMR Building	Hydrogen Bromide	10035-10-6	kg/yr	1.50	0.53
CMR Building	Hydrogen Chloride	7647-01-0	kg/yr	9.50	3.32
CMR Building	Hydrogen Fluoride, as F	7664-39-3	kg/yr	0.25	0.09
CMR Building	Methyl Alcohol	67-56-1	kg/yr	0.79	0.28
CMR Building	Nitric Acid	7697-37-2	kg/yr	67.34	23.57
CMR Building	Phosphoric Acid	7664-38-2	kg/yr	18.34	6.42
CMR Building	Silver (metal dust & soluble comp., as Ag)	7440-22-4	kg/yr	0.50	0.18
CMR Building	Sulfuric Acid	7664-93-9	kg/yr	36.80	12.88
Health Research Laboratory	Acetic Acid	64-19-7	kg/yr	2.62	0.92
Health Research Laboratory	Acetone	67-64-1	kg/yr	6.32	2.21
Health Research Laboratory	Chloroform	67-66-3	kg/yr	2.15	0.75
Health Research Laboratory	Cyclohexane	110-82-7	kg/yr	0.39	0.14
Health Research Laboratory	Dibutyl Phthalate	84-74-2	kg/yr	0.26	0.09
Health Research Laboratory	Ethanol	64-17-5	kg/yr	33.43	11.70
Health Research Laboratory	Ethyl Acetate	141-78-6	kg/yr	8.10	2.84
Health Research Laboratory	Glutaraldehyde	111-30-8	kg/yr	1.06	0.37
Health Research Laboratory	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr	0.66	0.23
Health Research Laboratory	Hydrogen Chloride	7647-01-0	kg/yr	4.15	1.45
Health Research Laboratory	Hydrogen Peroxide	7722-84-1	kg/yr	52.24	18.28

Key Facility	Chemical Name	CAS Number	Units	2010 Usage	2010 Estimated Air Emissions
Health Research Laboratory	Isopropyl Alcohol	67-63-0	kg/yr	34.96	12.23
Health Research Laboratory	Methyl Alcohol	67-56-1	kg/yr	27.38	9.58
Health Research Laboratory	Osmium Tetroxide, as Os	20816-12-0	kg/yr	0.49	0.17
Health Research Laboratory	Phenol	108-95-2	kg/yr	0.42	0.15
Health Research Laboratory	Phosphoric Acid	7664-38-2	kg/yr	0.73	0.26
Health Research Laboratory	Propyl Alcohol	71-23-8	kg/yr	0.81	0.28
Health Research Laboratory	Sulfuric Acid	7664-93-9	kg/yr	1.84	0.64
Health Research Laboratory	Trichloroacetic Acid	76-03-9	kg/yr	0.81	0.28
High Explosive Processing	2-Methoxyethanol (EGME)	109-86-4	kg/yr	2.89	1.01
High Explosive Processing	Acetone	67-64-1	kg/yr	21.56	7.55
High Explosive Processing	Acetonitrile	75-05-8	kg/yr	6.36	2.23
High Explosive Processing	Acetylene	74-86-2	kg/yr	8.22	0.00
High Explosive Processing	Acrylonitrile	107-13-1	kg/yr	0.40	0.14
High Explosive Processing	Bromine	7726-95-6	kg/yr	1.56	0.55
High Explosive Processing	Ethanol	64-17-5	kg/yr	71.71	25.10
High Explosive Processing	Ethyl Acetate	141-78-6	kg/yr	3.60	1.26
High Explosive Processing	Ethyl Ether	60-29-7	kg/yr	12.25	4.29
High Explosive Processing	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr	10.56	3.70
High Explosive Processing	Isopropyl Alcohol	67-63-0	kg/yr	0.79	0.27

Key Facility	Chemical Name	CAS Number	Units	2010 Usage	2010 Estimated Air Emissions
High Explosive Processing	Malononitrile	109-77-3	kg/yr	0.50	0.18
High Explosive Processing	Methyl Alcohol	67-56-1	kg/yr	25.48	8.92
High Explosive Processing	n,n-Dimethylformamide	68-12-2	kg/yr	5.69	1.99
High Explosive Processing	o-Dichlorobenzene	95-50-1	kg/yr	0.65	0.23
High Explosive Processing	Styrene	100-42-5	kg/yr	0.91	0.32
High Explosive Processing	Tetrachlorethylene	127-18-4	kg/yr	0.81	0.28
High Explosive Processing	Tetrahydrofuran	109-99-9	kg/yr	3.56	1.24
High Explosive Processing	Tin numerous forms	7440-31-5	kg/yr	0.50	0.01
High Explosive Testing	Acetylene	74-86-2	kg/yr	0.33	0.00
High Explosive Testing	Ethanol	64-17-5	kg/yr	486.22	170.18
High Explosive Testing	Hydrogen Chloride	7647-01-0	kg/yr	0.59	0.21
High Explosive Testing	Isopropyl Alcohol	67-63-0	kg/yr	37.70	13.20
High Explosive Testing	Methylene Chloride	75-09-2	kg/yr	0.66	0.23
High Explosive Testing	Nitric Acid	7697-37-2	kg/yr	0.76	0.27
High Explosive Testing	Sulfuric Acid	7664-93-9	kg/yr	4.60	1.61
LANSCE	Acetone	67-64-1	kg/yr	69.91	24.47
LANSCE	Acetonitrile	75-05-8	kg/yr	0.79	0.27
LANSCE	Acetylene	74-86-2	kg/yr	19.13	0.00
LANSCE	Aluminum numerous forms	7429-90-5	kg/yr	2.27	0.02
LANSCE	Chlorobenzene	108-90-7	kg/yr	2.11	0.74
LANSCE	Chloroform	67-66-3	kg/yr	2.97	1.04
LANSCE	Cyclohexane	110-82-7	kg/yr	0.78	0.27
LANSCE	Ethanol	64-17-5	kg/yr	10.18	3.56
LANSCE	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr	7.92	2.77

Key Facility	Chemical Name	CAS Number	Units	2010 Usage	2010 Estimated Air Emissions
LANSCE	Hydroquinone	123-31-9	kg/yr	1.33	0.46
LANSCE	Indium & compounds, as In	7440-74-6	kg/yr	0.91	0.32
LANSCE	Isopropyl Alcohol	67-63-0	kg/yr	20.03	7.01
LANSCE	Isopropylamine	75-31-0	kg/yr	10.34	3.62
LANSCE	Lead, el.&inorg.compounds, as Pb	7439-92-1	kg/yr	0.46	0.00
LANSCE	Methyl Alcohol	67-56-1	kg/yr	20.58	7.20
LANSCE	Methyl Methacrylate	80-62-6	kg/yr	0.94	0.33
LANSCE	Methylene Chloride	75-09-2	kg/yr	1.99	0.70
LANSCE	Pentane (all isomers)	109-66-0	kg/yr	5.01	1.75
LANSCE	Phosphoric Acid	7664-38-2	kg/yr	0.50	0.18
LANSCE	Potassium Hydroxide	1310-58-3	kg/yr	3.00	1.05
LANSCE	Propane	74-98-6	kg/yr	2.35	0.00
LANSCE	Styrene	100-42-5	kg/yr	0.91	0.32
LANSCE	Sulfur Hexafluoride	2551-62-4	kg/yr	237.68	83.19
LANSCE	Tetrahydrofuran	109-99-9	kg/yr	0.89	0.31
LANSCE	Toluene	108-88-3	kg/yr	15.60	5.46
Machine Shops	Acetylene	74-86-2	kg/yr	8.55	0.00
Machine Shops	Propane	74-98-6	kg/yr	0.25	0.00
Material Science Laboratory	Acetone	67-64-1	kg/yr	15.80	5.53
Material Science Laboratory	Hydrogen Chloride	7647-01-0	kg/yr	5.94	2.08
Material Science Laboratory	Hydrogen Peroxide	7722-84-1	kg/yr	3.52	1.23
Material Science Laboratory	Isopropyl Alcohol	67-63-0	kg/yr	40.85	14.30
Material Science Laboratory	Nitric Acid	7697-37-2	kg/yr	3.82	1.34
Plutonium Facility Complex	Acetylene	74-86-2	kg/yr	8.55	0.00

Key Facility	Chemical Name	CAS Number	Units	2010 Usage	2010 Estimated Air Emissions
Plutonium Facility Complex	Chloroform	67-66-3	kg/yr	1.48	0.52
Plutonium Facility Complex	Ethanol	64-17-5	kg/yr	24.58	8.60
Plutonium Facility Complex	Hydrogen Chloride	7647-01-0	kg/yr	284.88	99.71
Plutonium Facility Complex	Methyl Alcohol	67-56-1	kg/yr	4.75	1.66
Plutonium Facility Complex	n,n-Dimethylformamide	68-12-2	kg/yr	1.90	0.66
Plutonium Facility Complex	Nitric Acid	7697-37-2	kg/yr	32.05	11.22
Plutonium Facility Complex	Propane	74-98-6	kg/yr	2.01	0.00
Plutonium Facility Complex	Trichloroethylene	79-01-6	kg/yr	64.43	22.55
Radiochemistry Site	1,4-Dioxane	123-91-1	kg/yr	1.76	0.62
Radiochemistry Site	Acetic Acid	64-19-7	kg/yr	2.10	0.73
Radiochemistry Site	Acetone	67-64-1	kg/yr	155.22	54.33
Radiochemistry Site	Acetonitrile	75-05-8	kg/yr	19.72	6.90
Radiochemistry Site	Ammonia	7664-41-7	kg/yr	24.40	8.54
Radiochemistry Site	Ammonium Chloride (Fume)	12125-02-9	kg/yr	1.00	0.35
Radiochemistry Site	Chloroform	67-66-3	kg/yr	1.48	0.52
Radiochemistry Site	Ethanol	64-17-5	kg/yr	80.91	28.32
Radiochemistry Site	Ethyl Acetate	141-78-6	kg/yr	37.81	13.23
Radiochemistry Site	Ethyl Ether	60-29-7	kg/yr	22.75	7.96
Radiochemistry Site	Ethylene Diamine	107-15-3	kg/yr	0.90	0.31
Radiochemistry Site	Ethylene Dichloride	107-06-2	kg/yr	0.62	0.22
Radiochemistry Site	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr	54.87	19.21
Radiochemistry Site	Hydrogen Bromide	10035-10-6	kg/yr	8.25	2.89
Radiochemistry Site	Hydrogen Chloride	7647-01-0	kg/yr	310.46	108.66

Key Facility	Chemical Name	CAS Number	Units	2010 Usage	2010 Estimated Air Emissions
Radiochemistry Site	Hydrogen Fluoride, as F	7664-39-3	kg/yr	3.21	1.12
Radiochemistry Site	Hydrogen Peroxide	7722-84-1	kg/yr	33.20	11.62
Radiochemistry Site	Iodine	7553-56-2	kg/yr	0.25	0.09
Radiochemistry Site	Isopropyl Alcohol	67-63-0	kg/yr	15.71	5.50
Radiochemistry Site	m-Cresol	108-39-4	kg/yr	1.00	0.35
Radiochemistry Site	Methyl Alcohol	67-56-1	kg/yr	33.24	11.63
Radiochemistry Site	Methylene Chloride	75-09-2	kg/yr	93.92	32.87
Radiochemistry Site	n,n-Dimethyl Acetamide or Dimethyl Acetamide	127-19-5	kg/yr	2.83	0.99
Radiochemistry Site	n,n-Dimethylformamide	68-12-2	kg/yr	6.17	2.16
Radiochemistry Site	Nickel, metal (dust) or Soluble & Inorganic Comp.	7440-02-0	kg/yr	0.30	0.11
Radiochemistry Site	Nitric Acid	7697-37-2	kg/yr	839.60	293.86
Radiochemistry Site	o-Phenylenediamine	95-54-5	kg/yr	0.35	0.12
Radiochemistry Site	Pentane (all isomers)	109-66-0	kg/yr	0.75	0.26
Radiochemistry Site	Phenol	108-95-2	kg/yr	0.25	0.09
Radiochemistry Site	Phosphoric Acid	7664-38-2	kg/yr	12.84	4.49
Radiochemistry Site	Platinum Metal	7440-06-4	kg/yr	10.73	3.75
Radiochemistry Site	Potassium Hydroxide	1310-58-3	kg/yr	4.02	1.41
Radiochemistry Site	Propane	74-98-6	kg/yr	654.63	0.00
Radiochemistry Site	Silica, Quartz	14808-60-7	kg/yr	1.00	0.35
Radiochemistry Site	Sulfuric Acid	7664-93-9	kg/yr	5.52	1.93
Radiochemistry Site	Tellurium & Compounds, as Te	13494-80-9	kg/yr	0.50	0.18
Radiochemistry Site	Tetrahydrofuran	109-99-9	kg/yr	26.23	9.18
Radiochemistry Site	Thionyl Chloride	7719-09-7	kg/yr	0.50	0.18
Radiochemistry Site	Toluene	108-88-3	kg/yr	3.47	1.21
Radiochemistry Site	Tributyl Phosphate	126-73-8	kg/yr	0.49	0.17
Radiochemistry Site	Triethylamine	121-44-8	kg/yr	0.78	0.27
Radiochemistry Site	VM & P Naphtha	8032-32-4	kg/yr	3.00	1.05

Key Facility	Chemical Name	CAS Number	Units	2010 Usage	2010 Estimated Air Emissions
Radiological Liquid Waste Treatment Facility	Ammonia	7664-41-7	kg/yr	39.48	13.82
Radiological Liquid Waste Treatment Facility	Phosphoric Acid	7664-38-2	kg/yr	11.00	3.85
Radiological Liquid Waste Treatment Facility	Potassium Hydroxide	1310-58-3	kg/yr	6.04	2.11
Radiological Liquid Waste Treatment Facility	Sulfuric Acid	7664-93-9	kg/yr	33.12	11.59
Sigma Complex	Acetone	67-64-1	kg/yr	3.16	1.11
Sigma Complex	Diethylene Triamine	111-40-0	kg/yr	0.96	0.34
Sigma Complex	Ethanol	64-17-5	kg/yr	37.55	13.14
Sigma Complex	Hydrogen Chloride	7647-01-0	kg/yr	2.97	1.04
Sigma Complex	Isopropyl Alcohol	67-63-0	kg/yr	40.85	14.30
Sigma Complex	Methyl Alcohol	67-56-1	kg/yr	3.17	1.11
Sigma Complex	n-Heptane	142-82-5	kg/yr	1.37	0.48
Sigma Complex	Nitric Acid	7697-37-2	kg/yr	3.82	1.34
Sigma Complex	Propane	74-98-6	kg/yr	0.66	0.00
Sigma Complex	Tungsten as W insoluble Compounds	7440-33-7	kg/yr	4.00	0.04
Solid Radioactive Chemical Waste Facility	Propane	74-98-6	kg/yr	0.25	0.00
Target Fabrication Facility	Acetic Acid	64-19-7	kg/yr	0.52	0.18
Target Fabrication Facility	Acetone	67-64-1	kg/yr	24.49	8.57
Target Fabrication Facility	Aluminum numerous forms	7429-90-5	kg/yr	2.50	0.03
Target Fabrication Facility	Ethanol	64-17-5	kg/yr	27.91	9.77
Target Fabrication Facility	Ethylene Dichloride	107-06-2	kg/yr	2.47	0.86

Key Facility	Chemical Name	CAS Number	Units	2010 Usage	2010 Estimated Air Emissions
Target Fabrication Facility	Methyl Alcohol	67-56-1	kg/yr	12.66	4.43
Target Fabrication Facility	Methyl Silicate	681-84-5	kg/yr	0.80	0.28
Target Fabrication Facility	n,n-Dimethyl Acetamide or Dimethyl Acetamide	127-19-5	kg/yr	8.49	2.97
Target Fabrication Facility	n,n-Dimethylformamide	68-12-2	kg/yr	7.59	2.66
Target Fabrication Facility	Nickel, metal (dust) or Soluble & Inorganic Comp.	7440-02-0	kg/yr	0.50	0.18
Target Fabrication Facility	Pentane (all isomers)	109-66-0	kg/yr	0.38	0.13
Target Fabrication Facility	Tetrahydrofuran	109-99-9	kg/yr	7.11	2.49
Target Fabrication Facility	Toluene	108-88-3	kg/yr	17.34	6.07

Appendix C: Nuclear Facilities List

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DOE/LANL LIST OF LOS ALAMOS NATIONAL LABORATORY NUCLEAR FACILITIES

U.S. Department of Energy
National Nuclear Security Administration
Los Alamos Site Office

Los Alamos National Laboratory
Safety Basis Division

APPROVED FOR USE	
R. M. Mobley LANL Safety Basis Division	2/18/11 Date
Thomas L. Forbes LASO Safety Basis Team Leader	03/01/2011 Date
[signature] LASO Manager	3/7/11 Date

Record of Document Revisions

Revision Record		
Revision	**Date**	**Summary**
0	April 2000	Original Issue.
1	June 2001	Updated nuclear facility list and modified format.
2	December 2001	Corrected CSOs, referenced DOE approval memo for 10 CFR 830 compliant facilities, new acronym list, and safety basis documentation update since last revision.
3	July 2002	Semi-annual update.
4	February 2004	Update safety basis documentation for Transportation, TA-18 LACEF, TA-8-23 Radiography, TA-21 TSTA, and TA-50 RLWTF. Added 11 Environmental Sites that were categorized as Hazard Category 2 and Hazard Category 3 Nuclear Facilities. TA-21 TSTA, TA-48-1 Radiochemistry, and TA-50 RAMROD were downgraded to Radiological Facilities and removed from this list. The facility contacts were changed from the Facility Manager and Facility Operations to Responsible Division Leader and Facility Management Unit.
5	August 2004	Updated TA-50 RLWTF as Hazard Category 2 Nuclear Facility, Added DVRS as a temporary Hazard Category 2 Nuclear Facility. Downgraded TSFF to a Hazard Category 3 Nuclear Facility from a Hazard Category 2. The organization of the Nuclear Facility List was modified to identify only the document that categorizes the facility. Other safety basis documents related to a facility would be identified in the Authorization Agreements. The purpose of this was to reduce redundancy and conflicts between the Nuclear Facility List and Authorization Agreements.
6	June 2005	Removed TA-8-23 from Nuclear Facility per SABM/STEELE 040805, "Approval of request to Recategorize the TA-8-23 Nuclear Facility to a less than High Hazard Radiological Facility" dated 4/8/2005. Updated TA55 PF-185 as a Hazard Category 2 Nuclear Facility per SABM:STEEL, "TA-55-PF185 OSRP SB Approval" dated 5/17/2005. Updated TA55 PF-355 as a Hazard Category 2 Nuclear Facility per SER for SST Facility, dated 5/25/2005. Updated various RDLs, editorial changes, etc. Tables columns listing the DOE CSO, and the LANL FMU were deleted upon consultation between SBO and SABT. Table rows re-ordered for easier reading.
7	October 2005	Removed TSFF per the successful OFO V&V per SABM: Steele: Approval of 2nd LANL Submittal Request for TSFF Downgrade; dated 8/1/2005

Revision Record		
Revision	**Date**	**Summary**
8	January 2007	Removed LANSCE 1L Target, Lujan Center, and component storage facilities due to PCM-06-016; Removed TA-55, PF-185 per SBT:5485.3:5SS-06-003; Removed TWISP per SABT:5485.3:CMK:103105; Updated RDL to be the current FODs relative to 5485.1 SABT:8JF-001; Updated general editorial elements (e.g., PS-SBO to SB, summary of Table 5-1, deletion of "Performance Surety", etc.)
9	September 2007	Removed TA-18 due to facility downgrade per FRT:5RA-001; Removed DVRS per EO:2JEO-007 dated 4/2/2007; Removed TA-10 due to SBT:5KK-003; updated WCRRF due to ABD-WFM-005, R. 0; updated NES to be referenced to NES-ABD-0101, R.1.0
10	January 2008	Re-categorized RLWTF per memo SBT:CMK-002, Removed SST Pad per 5485.3/SBT:JF-39193
11	September 2009	Removed MDA B per SBT:2SBLJ-56803; Removed WWTP per 2009 SBT:25BLJ-49261; Removed Pratt Canyon per SBT:25BLJ-49261.Added EF Firing Site per AD-NHHO:09-93; editorial changes (e.g., removed SB-40 1 since the old EWMO-document numbering system is no longer utilized by the Safety Basis Division).
12	January 2011	Removed MDA-C per COR-SO-6.30.2010-264748; Removed TA-53 Resin Tank per COR-SO-2.8.2010-232928; Removed EF Site per COR-SO-9.15.2010-282846; added TA-50-0248 to Table 5-2 per AD-NHHO:11-041 Response to question about adding Building TA-50-248 to the DOE/LANL List of LANL Nuclear Facilities. Removed "and three disposal pits" from MDA-A per COR-SO-1.4.2010-223375

Changes in Nuclear Facility Status

Date	Description
3/97	Omega West Reactor (OWR), TA-2-1, downgraded from hazard category 2 reactor facility to a radiological facility. OWR removed from the nuclear facilities list.
9/98	Safety Analysis Report (SAR) approved accepting the Radioactive Materials, Research, Operations, and Demonstration Facility (RAMROD), TA-50-37, as a hazard category 2 nuclear facility. RAMROD added to the nuclear facilities list.
9/98	TA-35 Buildings 2 and 27 downgraded from a hazard category 2 nuclear facility to a hazard category 3 nuclear facility.
9/98	Basis of Interim Operations (BIO) approved accepting the Los Alamos Neutron Science Center (LANSCE) A-6 Isotope Production and Materials Irradiation and 1L Manuel Lujan Neutron Scattering Center (MLNSC) Target Facilities as hazard category 3 nuclear facilities.
10/98	TA-8 Radiography Facility Buildings 24 and 70 downgraded from hazard category 2 nuclear facilities to radiological facilities.
11/98	Health Physics Calibration Facility (TA-3 SM-40, SM-65 and SM-130) downgraded from a hazard category 2 nuclear facility to a radiological facility. SM-40 and SM-65 had been hazard category 2 nuclear facilities while SM-130 had been a hazard category 3 nuclear facility. Health Physics Calibration Facility removed from the nuclear facilities list.
12/98	Radioactive Liquid Waste Treatment Facility (RLWTF) downgraded from a hazard category 2 nuclear facility to a hazard category 3 nuclear facility.
1/99	Pion Scattering Experiment of the TA-53 Nuclear Activities at Los Alamos Neutron Science Center (LANSCE) removed from the nuclear facilities list.
2/00	Building TA-50-190, Liquid Waste Tank, of the Waste Characterization Reduction and Repackaging Facility (WCRRF) removed from the nuclear facilities list.
3/00	DOE SER clarifies segmentation of the Waste Characterization Reduction and Repackaging Facility (WCRRF) as: 1) Building TA-50-69 designated as a hazard category 3 nuclear facility, 2) an outside operational area designated as a hazard category 2 nuclear facility, and 3) the Non-Destructive Assay (NDA) Mobile Facilities located outside TA-50-69 and designated as a hazard category 2 nuclear facility.
4/00	Building TA-3-159 of the TA-3 SIGMA Complex downgraded from hazard category 3 nuclear facility to a radiological facility and removed from the nuclear facilities list.
4/00	TA-35 Nonproliferation and International Security Facility Buildings 2 and 27 downgraded from hazard category 3 nuclear facilities to radiological facilities and removed from the nuclear facilities list.
3/01	TA-3-66, Sigma Facility, downgraded and removed from this nuclear list.
5/01	TA-16-411, Assembly Facility, downgraded and removed from this nuclear list.
5/01	TA-8-22, Radiography Facility, downgraded and removed from this nuclear list.
6/01	Site Wide Transportation added as a nuclear activity (included in 10 CFR 830 plan).
9/01	TA-53 LANSCE, WNR Target 4 JCO approved as hazard category 3 nuclear activity.

Changes in Nuclear Facility Status

Date	Description
10/01	TA-53 LANSCE IL JCO in relation to changes in operational parameters of the coolant system with an expiration date of 1/31/02.
10/01	TA-53 LANSCE Actinide BIO approved as hazard category 3 nuclear activity.
3/02	TA-33-86, High Pressure Tritium Facility (HPTF) removed from nuclear facilities list.
4/02	TA-53 LANSCE, DOE NNSA approves BIO for Storing Activated Components (A6, etc.) in Bldg 53-3 Sector M "Area A East" and added as hazard category 3 nuclear activity.
7/02	TA-53 LANSCE, WNR Facility Target 4 downgraded to below hazard category 3 and removed from the nuclear facilities list.
1/03	TA-50 Radioactive Materials, Research, Operations, and Demonstration (RAMROD) facility was downgraded to below hazard category 3 and removed from the nuclear facilities list.
6/03	TA-48-1, Radiochemistry and Hot Cell Facility was downgraded to below hazard category 3 and removed from the nuclear facilities list.
7/03	TA-21 Tritium System Test Assembly (TSTA) facility was downgraded to below hazard category 3 and removed from the nuclear facilities list.
11/03	TA-10 PRS 10-002(a)-00 (Former liquid disposal complex) environmental site was categorized as a hazard category 3 nuclear facility
11/03	TA-21 PRS 21-014 (Material Disposal Area A) environmental site was categorized as a hazard category 2 nuclear facility
11/03	TA-21 PRS 21-015 (Material Disposal Area B) environmental site was categorized as a hazard category 3 nuclear facility
11/03	TA-21 PRS 21-016(a)-99 (Material Disposal Area T) environmental site was categorized as a hazard category 2 nuclear facility
11/03	TA-35 PRS 35-001 (Material Disposal Area W, Sodium Storage Tanks) environmental site was categorized as a hazard category 3 nuclear facility
11/03	TA-35 PRS 35-003(a)-99 (Wastewater treatment plant (WWTP)) environmental site was categorized as a hazard category 3 nuclear facility
11/03	TA-35 PRS 35-003(d)-00 (Wastewater treatment plant – Pratt Canyon) environmental site was categorized as a hazard category 3 nuclear facility
11/03	TA-49 PRS 49-001(a)-00 (Material Disposal Area AB) environmental site was categorized as a hazard category 2 nuclear facility
11/03	TA-50 PRS 50-009 (Material Disposal Area C) environmental site was categorized as a hazard category 2 nuclear facility
11/03	TA-53 PRS 53-006(b)-99 (Underground tank with spent resins) environmental site was categorized as a hazard category 2 nuclear facility
11/03	TA-54 PRS 54-004 (Material Disposal Area H) environmental site was categorized as a hazard category 3 nuclear facility

Changes in Nuclear Facility Status

Date	Description
3/04	TA-54-38, Radioassay and Nondestructive Testing (RANT) Facility, is re-categorized as a Hazard Category 2 nuclear facility from Hazard Category 3.
6/04	TA-54-412 Decontamination and Volume Reduction Glovebox (DVRS) added to Nuclear Facility List. The facility will operate as a Hazard Category 2 not exceeding 5 months from the date LASO formally releases the facility for operations following readiness verification.
6/04	DOE Safety Evaluation Report for the TSFF BIO establishes that TSFF is re-categorized as a Hazard Category 3 from Hazard Category 2.
7/04	TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) was re-categorized as a Hazard Category 2 Nuclear Facility based on a DOE Memo dated March 20, 2002.
4/05	Removed TA-8-23 from Nuclear Facility List per SABM/STEELE 040805, "Approval of request to Recategorize the TA-8-23 Nuclear Facility to a less than High Hazard Radiological Facility" dated 4/8/2005.
5/05	Updated TA55 PF-185 as a Hazard Category 2 Nuclear Facility per SABM:STEEL, "TA-55-PF185 OSRP SB Approval" dated 5/17/2005.
5/05	Updated TA55 PF-355 as a Hazard Category 2 Nuclear Facility per SER for SST Facility dated 5/25/2005.
10/05	Removed TSFF from the Nuclear Facility List per SABM: Steele: Approval of 2nd LANL Submittal Request for TSFF Downgrade; dated 8/1/2005
1/07	Removed TWISP from the Nuclear Facility List per "Authorization for Removal of TWISP Mission from the LANL Nuclear Facility List as a hazard Category 2 Activity; SABT:5485.3:CMK:103105; Removed TA-55 PF-185 from the List per "Authorization for Removal of TA-55-PF-185 from the Nuclear Facility List; SBT:5485.3:5SS-06-003; Remove LANSCE 1L Target, Lujan Center, and component storage facilities due to PCM-06-016 Titles of positions updated to reflect current operations model (RDL to FODs, SABM to SBT Leader)

Changes in Nuclear Facility Status

Date	Description
9/07	Removed TA-18 from the Nuclear Facility List per FRT:5RA-001, " Downgrade of TA 18 from a Hazard Category 2 Nuclear Facility to a Radiological Low Hazard Facility," dated 4/5/2007 Removed DVRS from the Nuclear Facility List per EO:2JEO-007, "Approval of Strategy for Future Operations at the Decontamination and Volume Reduction System (DVRS) Facility," dated 4/2/2007 Removed TA-10 per SBT:5KK-003, "Re-categorization of TA-10, Bayo Canyon Nuclear Environmental Site," dated 8/10/2007. Updated WCRRF due to ABD-WFM-005, R.0, Basis for Interim Operation for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)," dated 4/23/2007. Updated NESs to be referenced "Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R1.0, dated 6/26/07.
11/08	TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) was approved to be re-categorized as a Hazard Category 3 Nuclear Facility per SBT:CMK-002. SST Pad removed as a Nuclear Facility per 5485.3/SBT:JF-39193, "Revocation of the Authorization Agreement for the Technical Area (TA)-55 Safe Secure Transport Facility, dated 1/16/08.
9/09	Removed MDA B per SBT:25BLJ-56803 which approved final hazard categorization MDAB-ADB-I004 Removed WWTP per SBT:25BLJ-49261 which approved final hazard categorization NES-ABD-0501 RI Removed Pratt Canyon per SBT:25BLJ-49261 which approves final hazard, categorization NES-ABD-0401 RI Added EF Firing Site per AD-NHHO:09-093
1/11	Removed MDA-C per COR-SO-6.30.2010-264748 Removed TA-53 Resin Tank per COR-SO-2.8.2010-232928 Removed EF Site per COR-SO-9.15.2010-282846 Added TA-50-0248 per AD-NHHO:11-041 Response to question about adding Building TA-50-248 to the DOE/LANL List of LANL Nuclear Facilities Removed "and three disposal pits" from MDA-A per COR-SO-1.4.2010-223375

FORWORD

1. This joint U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA), Los Alamos Site Office (LASO) and Los Alamos National Laboratory (LANL), document has been prepared by the LASO Safety Basis Team (SBT) and Safety Basis personnel at LANL. This document provides a tabulation and summary information concerning hazard category 1, 2 and 3 nuclear facilities at LANL. Currently, there are no hazard category 1 facilities at LANL.

2. This nuclear facility list will be updated to reflect changes in facility status caused by inventory reductions, final hazard classifications, exemptions, facility consolidations, and other factors.

3. DOE-STD-1027-92 methodologies are the bases used for identifying nuclear facilities to be included in this standard. Differences between this document and other documents that identify nuclear facilities may exist as this list only covers nuclear hazard category 2 and 3 facilities that must comply with the requirements stipulated in 10 CFR 830, Subpart B. Other documents might include facilities that have inventories below the nuclear hazard category 3 thresholds, such as radiological facilities.

LIST OF ACRONYMS AND ABBREVIATIONS

Term	Meaning
BIO	Basis for Interim Operations
BUS	Business Operations (Division)
CFR	Code of Federal Regulations
CMR	Chemistry and Metallurgy Research (Facility)
CSO	cognizant secretarial officer
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
DVRS	decontamination and volume reduction glovebox
EWM	Environmental Waste Management
FMU	facility management unit
HC	hazard category
HPTF	High Pressure Tritium Facility
JCO	justification for continued operations
LACEF	Los Alamos Criticality Experiment Facility
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center
LASO	Los Alamos Site Office
LLW	low-level waste
MDA	material disposal area
MLNSC	Manuel Lujan Neutron Scattering Center
NDA	non-destructive assay
NES	Nuclear Environmental Site
NNSA	National Nuclear Security Administration
OSD	Operations Support Division
OSRP	Offsite Source Recovery Project
OWR	Omega West Reactor
PRS	Potential Release Site
Pu	plutonium
RAMROD	Radioactive Material, Research, Operations, and Demonstration (Facility)
RANT	Radioactive Assay Nondestructive Testing (Facility)
RDL	Responsible Division Leader
Rev.	revision
RLWTF	Radioactive Liquid Waste Treatment Facility
SA	safety assessment
SAR	safety analysis report
SER	safety evaluation report
SM	South Mesa
STD	standard
SST	Safe-Secure Trailer
TA	technical area
TRU	transuranic
TSD	transportation safety document

Term	Meaning
TSR	technical safety requirement
WCRRF	Waste Characterization, Reduction and Repackaging Facility
WETF	Weapons Engineering Tritium Facility
WFO	Weapons Facilities Operations

1 SCOPE

Standard DOE-STD-1027-92, Change 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, provides methodologies for the hazard categorization of DOE facilities based on facility material inventories and material at risk. This document lists hazard category 2 and 3 nuclear facilities because they must comply with requirements in Title10, *Code of Federal Regulations*, Part 830, Nuclear Safety Management, Subpart B, "Safety Basis Requirements." The Los Alamos National Laboratory (LANL) nuclear facilities that are below hazard category 3 (radiological facilities) have not been included on this list because they are exempt from the requirements in 10 CFR 830, Subpart B.

2 PURPOSE

This document provides a list of hazard category 2 (HC2) and 3 (HC3) nuclear facilities at LANL. The list will be revised, as appropriate, to reflect changes in facility status resulting from final hazard categorization, movement, relocation, or final disposal of radioactive inventories. The list shall be used as the basis for determining initial applicability of DOE nuclear facility requirements. The list now identifies the categorization of site wide transportation and environmental sites per the requirements of 10 CFR 830, Subpart B.

3 APPLICABILITY

This standard is intended for use by NNSA and contractors with responsibilities for facility operation and/or oversight at LANL.

4 REFERENCES

4.1 49 CFR 173.469, Title 49, Code of Federal Regulations, Part 173 *Shippers - General Requirements for Shipments and Packagings.*

4.2 DOE O 420.2B, Change 1, *Safety of Accelerator Facilities*, USDOE, 7/23/04.

4.3 DOE-STD-1027-92, Change 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, USDOE, 9/97.

4.4 10 CFR 830, Title 10, Code of Federal Regulations, Part 830, *Nuclear Safety Management.*

4.5 ANSI N43.6, American National Standards Institute (ANSI) N43.6, *American National Standard for General Radiation Safety—Sealed Radioactive Sources, Classification.*

5 NUCLEAR FACILITIES LIST

Table 5-1 identifies all HC2 and HC3 nuclear facilities at LANL. Facilities have been categorized based on criteria in DOE-STD-1027-92, Change 1. Site, zone or area, building number, name, and dominant hazard category identifies each facility. The dominant hazard category is determined by identifying the highest hazard category for multi-process facilities. Buildings, structures, and processes addressed by a common documented safety analysis have been designated as a single facility. DOE-STD-1027-92, Change 1, permits exclusion of sealed radioactive sources from a radioactive inventory of the facility if the sources were fabricated and tested in accordance with 49 CFR 173.469 or ANSI N43.6. In addition, material contained in U.S. Department of Transportation (DOT) Type B shipping containers may also be excluded from radioactive inventory. Facilities containing only material tested or stored in accordance with these standards do not appear in the list and tables that follow.

TABLE 5-1. Summary of LANL Nuclear Facilities

HAZ CAT	FACILITY NAME
2	Site Wide Transportation
2	TA-16 Weapons Engineering Tritium Facility (WETF)
2	TA-3 Chemistry and Metallurgy Research Facility (CMR)
2	TA-55 Plutonium Facility
3	TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF)
2	TA-50 Waste Characterization Reduction and Repackaging Facility (WCRRF)
2	TA-54 Waste Storage and Disposal Facility (Area G)
2	TA-54 Radioactive Assay Nondestructive Testing (RANT) Facility
2	TA-21 MDA A NES (General's Tanks)
2	TA-21 MDA T NES
3	TA-35 MDA W NES
2	TA-49 MDA AB NES
3	TA-54 MDA H NES

6 LANL NUCLEAR FACILITIES SUMMARY TABLES

Table 5-2 lists the categorization basis information and a brief description for each nuclear facility identified in Table 5-1.

TABLE 5-2. Nuclear Facility Categorization Information

TA	Bldg	Haz Cat	Facility Name	Description	Categorization Basis	FOD
Site Wide		2	Site Wide Transportation	Laboratory nuclear materials transportation	SER TSD.01, Safety Evaluation Report, Rev 3, approving Los Alamos National Laboratory (LANL) Transportation Safety Document (TSD) P&T-SA-002, R5 Technical Safety Requirements (TSRs) P&T-TSR-001, R2, September 2008	OSD
16	0205 0450	2	Weapons Engineering and Tritium Facility (WETF)	Tritium Research	Safety Evaluation Report (SER) for WETF, SER-Rev.0, March 27, 2002.	WFO
3	0029	2	Chemistry and Metallurgy Research Facility CMR	Actinide chemistry research and analysis	CMR Basis for Interim Operations, dated August 26, 1998	CMR
55	4	2	TA-55 Plutonium Facility	Pu glovebox lines; processing of isotopes of Pu	Safety Evaluation Report of the Los Alamos National Laboratory Technical Area 55 Plutonium Building-4, Safety Analysis Report and Technical Safety Requirements, December 1996.	TA-55
50	0001	3	TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF)	Main treatment plant, pretreatment plant, decontamination operation	LANL Letter: Comment Response Regarding the RLWTF Hazard Category 3 Confirmation, AD-NHHO:08-100, April 2008.	TA-55
	0002	3		Low level liquid influence tanks, treatment effluent tanks, low level sludge tanks		
	0066	3		Acid and Caustic waste holding tanks		
	0090	3		Holding tank		
	0248	3		4 Waste water holding tanks	AD-NHHO:11-041 Response to question about adding Building TA-50-248 to the DOE/LANL List of LANL Nuclear Facilities	
50	0069	2	TA-50 Waste Characterization Reduction and	Waste characterization, reduction, and repackaging facility	*Basis for Interim Operation for Waste Characterization, Reduction, and Repackaging Facility (WCRRF),*	EWM
	External	2		Drum staging activities outside TA-50-69		

TABLE 5-2. Nuclear Facility Categorization Information

TA	Bldg	Haz Cat	Facility Name	Description	Categorization Basis	FOD
50	0069	2	Repackaging Facility (WCRRF)	Waste characterization, reduction, and repackaging facility	ABD-WFM-005, R.0, April 23, 2007	EWM
	External	2		Drum staging activities outside TA-50-69		

TABLE 5-2. Nuclear Facility Categorization Information (cont.)

TA	Bldg	Haz Cat	Facility Name	Description	Categorization Basis	FOD
54	Area G	2	TA-54 Waste Storage and Disposal Facility (Area G)	Low level waste (LLW) (including mixed waste) storage and disposal in domes, pits, shafts, and trenches. TRU waste storage in domes and shafts (does not include TWISP). TRU legacy waste in pits and shafts. Low level disposal of asbestos in pits and shafts. Operations building; TRU waste storage.	U.S. Department of Energy, National Nuclear Security Administration SER for TA-55 Area G DSA 11/28/03; Final Documented Safety Analysis (DSA) Technical Area 54, Area g, ABD-WFM-001, Rev.0 April 9, 2003, ADB-WFM-002, Rev. 0, November 10, 2003.	EWM
54	0038	2	TA-54 Radioactive Assay Nondestructive Testing (RANT) Facility	TRUPACT-II and HalfPACT loading of drums for shipment to WIPP	Safety Evaluation Report, Basis for Interim Operation (BIO) and Technical Safety Requirements for the Radioassay and Nondestructive Testing (RANT) Facility, Technical Area 54-38, ABD-WFM-007, Rev. 0, May 30, 2003; LASO December 23, 2003	EWM
21	21-014	2	TA-21 MDA A NES	An inactive Material Disposal Area containing two buried 50,000 gal. storage tanks (the "General's Tanks")	"Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R.1.0, June, 2007	TA21
21	TA-21	2	TA-21 MDA T NES	An inactive Material Disposal Area consisting of four inactive absorption beds, a distribution box, a portion of the subsurface retrievable waste storage area, and disposal shafts.	"Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R.1.0, June, 2007	TA21
5	35-001	3	TA-35 MDA W NES	An inactive Material Disposal Area consisting of two vertical shafts or "tanks" that were used for the disposal of sodium coolant used in LAMPRE-1 research reactor.	"Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R.1.0, June, 2007	TA21

TABLE 5-2. Nuclear Facility Categorization Information (cont.)

TA	Bldg	Haz Cat	Facility Name	Description	Categorization Basis	FOD
49	TA-49	2	TA-49 MDA AB NES	An underground, former explosive test site comprised of three distinct areas, each with a series of deep shafts used for subcritical testing.	"Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R.1.0, June, 2007	TA21
54	54-004	3	TA-54 MDA H NES	An inactive Material Disposal Area located on Mesita del Buey containing nine shafts that were used for disposal of classified materials.	"Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R.1.0, June, 2007	TA21

Appendix D: Less-than-Hazard-Category-3 Nuclear Facilities List

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Safety Basis Division		Rev. 0 April 2009

LISTING OF LOS ALAMOS NATIONAL LABORATORY LESS-THAN HAZARD CATEGORY 3 NUCLEAR FACILITIES

Safety Basis Technical Services	Date
Safety Basis Division Leader	Date
Associate Director, NHHO	Date

Record of Document Revisions

Revision Record		
Revision	**Date**	**Summary**
0	April 2009	Original Issue.

SCOPE

Department of Energy Standard, DOE-STD-1027-92, Change 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, provides a methodology to develop the hazard categorization of a nuclear facility based only on the quantities of radioactive material in the facility. This document lists the less-than-hazard category 3 (HC-3) nuclear facilities that must comply with requirements in 10CFR830, Nuclear Safety Management, Subpart A, "Quality Assurance Requirements", as well as the appropriate safety management programs necessary based on their non-nuclear facility categorization. These facilities do not have to comply with the requirements in Subpart B of 10CFR830.

PURPOSE

This document provides the enumeration of less-than HC-3 nuclear facilities at the Laboratory. These facilities are also known as "Radiological Facilities", however that term has no precise definition if the Code of Federal Law, Department of Energy Directives, nor Department of Energy Standards.

The list will be revised, as appropriate, to reflect changes in facility status resulting from final hazard categorization or movement, relocation, or final disposal of radioactive inventories.

APPLICABILITY

This document is intended for use by Laboratory personnel, any contractors who support Laboratory functions, DOE/NNSA personnel, and any other persons interested in nuclear safety management at the Laboratory.

REFERENCES

1.1 10 CFR 830, Title 10, *Code of Federal Regulations*, Part 830, "Nuclear Safety Management."

1.2 DOE-STD-1027-92, Change 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, USDOE, 9/97.

1.3 49 CFR 173.469, Title 49, *Code of Federal Regulations,* Part 173 "Shippers - General Requirements for Shipments and Packagings."

1.4 ANSI N43.6, American National Standards Institute (ANSI) N43.6, "American National Standard for General Radiation Safety—Sealed Radioactive Sources, Classification".

RADIOLOGICAL FACILITIES LIST

Table 1 lists the less-than HC-3 nuclear facilities at the Los Alamos National Laboratory. These facilities have been categorized based on criteria in DOE-STD-1027-92, Change 1. Site, zone or area, building number, name, and dominant hazard category identifies each facility. The dominant hazard category is determined by identifying the highest hazard category for multi-process facilities. Buildings, structures, and processes addressed by a common safety basis document have been designated as a single facility. DOE-STD-1027-92, Change 1, permits exclusion of sealed radioactive sources from a radioactive inventory of the facility if the sources were fabricated and tested in accordance with 49 CFR 173.469 or ANSI N43.6.

In addition, material contained in U.S. Department of Transportation (DOT) Type B shipping containers may also be excluded from radioactive inventory. Facilities containing only material tested or stored in accordance with these standards do not appear in the list and tables that follow.

LANL LESS-THAN HAZARD CATEGORY-3 NUCLEAR FACILITIES SUMMARY TABLES

Table 1: Less-than HC-3 Nuclear Facility Categorization Information

	TA-Bldg	FOD	RAD	Facility	Description	Haz Cat Document
1.	TA-03-0016	IFCS		Ion Beam Facility	Radiological contamination	
2.	TA-03-0032	STO	ADEPS	Superconduc. Tech Center(STC)	Depleted Uranium	MST-AB-FOM-ALL-04-0002, rev.0
3.	TA-03-0034	STO	ADEPS	Cryogenics Bldg "B"	Various	MST-AB-FOM-ALL-04-0002, rev.0
4.	TA-03-0035	STO	ADEPS	Press Bldg	U-235, Depleted Uranium	PRO-0010-MCFO-AB-SIG RAM
5.	TA-03-0039	STO	ADEES	Manufacturing Shops	Contamination; possible DU storage	
6.	TA-03-0040	STO	ADEPS	Physics Bldg, office and lab	Sealed sources*, various	TRPFOD-OPS-SORD-011.0
7.	TA-03-0065	IFCS		Source Storage Bldg	Radiation effect Lab.	
8.	TA-03-0066	STO	ADEPS	Sigma	U-235, Depleted Uranium	PRO-0010-MCFO-AB-SIG RAM
9.	TA-03-0102	STO	ADEES	Tuballoy Machine Shop	Depleted Uranium	
10.	TA-03-0130	IFCS		Source Storage Bldg	Co-60	
11.	TA-03-0141	STO	ADEES	BTF	Depleted Uranium	PRO-0010-MCFO-AB-SIG RAM
12.	TA-03-0159	STO	ADEPS	Forming Bldg	Th-232; DU	PRO-0010-MCFO-AB-SIG RAM
13.	TA-03-0215	STO	ADEPS		Sealed sources*, various	TRPFOD-OPS-SORD-011.0
14.	TA-03-0216	STO	ADEPS		Sealed sources*, various	TRPFOD-OPS-SORD-011.0
15.	TA-03-0218	STO	ADEPS		Sealed sources*, various	TRPFOD-OPS-SORD-011.0
16.	TA-03-0169	STO	ADEPS	Warehouse	Depleted Uranium	PRO-0010-MCFO-AB-SIG RAM
17.	TA-03-0317	STO	ADEES	BTF - Graphite Storage	Depleted Uranium	PRO-0010-MCFO-AB-SIG RAM
18.	TA-03-0451	STO	ADEPS	Sigma Office	None	
19.	TA-03-0494	STO	ADEPS		Sealed sources*, various	TRPFOD-OPS-SORD-011.0
20.	TA-03-0541	STO	ADEPS	Sigma Storage Shed		PRO-0010-MCFO-AB-SIG RAM
21.	TA-03-1698	STO	ADEPS	Material Science Lab	Depleted Uranium	MST-AB-FOM-ALL-04-0002, rev.0
22.	TA-03-1819	STO	ADEPS	Experimental Material Science	Depleted Uranium	MST-AB-FOM-ALL-04-0002, rev.0

	TA-Bldg	FOD	RAD	Facility	Description	Haz Cat Document
23.	TA-03-2002	STO	ADEPS	X-Ray Machine Lab	Depleted Uranium	MST-AB-FOM-ALL-04-0002, rev.0
24.	TA-03-2132	STO	ADEPS	Sigma Safety Storage Shed		PRO-0010-MCFO-AB-SIG RAM
25.	TA-03-2322	STO	ADTR	NISC	Sealed Source Work* and Radiography	N-OP-PLN-0010.3
26.	TA-08-0022	WFO	ADEES	X-Ray Facility	Depleted Uranium	ESA-WOI-OP-41.0, R.1
27.	TA-08-0023	WFO	ADEES	Betatron Bldg	Depleted Uranium	ESA-WOI-OP-41.0, R.1
28.	TA-08-0065	WFO	ADEES	Sealed Sources	Depleted Uranium	ESA-WOI-OP-41.0, R.1
29.	TA-08-0070	WFO	ADEES	Non Destructive Testing	Depleted Uranium	ESA-WOI-OP-41.0, R.1
30.	TA-08-0120	WFO	ADEES	Radiography	DU	ESA-WOI-OP-41.0, R.1
31.	TA-11-0002	WFO	ADWP	Vibration Test	Depleted Uranium	ESA-WOI-OP-41.0, R.1
32.	TA-11-0025	WFO	ADWP		Depleted Uranium	ESA-WOI-OP-41.0, R.1
33.	TA-11-0030	WFO	ADWP	Vibration Test Bldg	Depleted Uranium	ESA-WOI-OP-41.0, R.1
34.	TA-11-0036	WFO	ADWP	HE Magazine		
35.	TA-11-0065	WFO	ADWP	Burn Pit	Depleted Uranium	ESA-WOI-OP-41.0, R.1
36.	TA-15 DART Firing Site	WFO		Firing Site (R307)	DU contamination	
37.	TA-15-R183	WFO		Vault	Depleted Uranium	
38.	TA-16-0202	WFO	ADEES	Laboratory	DU,	ESA-WOI-OP-42.0, R.1
39.	TA-16-0207	WFO	ADWP	Component Testing	DU	ESA-WOI-OP-41.0, R.1
40.	TA-16-0260	WFO	ADWP		Depleted Uranium	ESA-WOI-OP-41.0, R.1
41.	TA-16-0261	WFO	ADWP		DU	ESA-WOI-OP-41.0, R.1
42.	TA-16-0263	WFO	ADWP		DU	ESA-WOI-OP-41.0, R.1
43.	TA-16-0267	WFO	ADWP		DU, legacy cont.	ESA-WOI-OP-41.0, R.1
44.	TA-16-0280	WFO	ADWP	Inspection Building	DU	ESA-WOI-OP-41.0, R.1
45.	TA-16-0281	WFO	ADWP	Rest House	DU	ESA-WOI-OP-41.0, R.1
46.	TA-16-0283	WFO	ADWP	Component Storage	DU	ESA-WOI-OP-41.0, R.1
47.	TA-16-0285	WFO	ADWP	Component Storage	DU	ESA-WOI-OP-41.0, R.1
48.	TA-16-0300	WFO	ADWP	Component Storage	DU/Th-232	ESA-WOI-OP-41.0, R.1

	TA-Bldg	FOD	RAD	Facility	Description	Haz Cat Document
49.	TA-16-0301	WFO	ADWP	Component Storage	Depleted Uranium	ESA-WOI-OP-41.0, R.1
50.	TA-16-0302	WFO	ADWP	Component Storage Training	DU	ESA-WOI-OP-41.0, R.1
51.	TA-16-0332	WFO	ADWP	Component Storage	Depleted Uranium	ESA-WOI-OP-41.0, R.1
52.	TA-16-0410	WFO	ADWP	Assembly Building	Depleted Uranium	ESA-WOI-OP-41.0, R.1
53.	TA-16-0411	WFO	ADWP	Assembly Building	Depleted Uranium	ESA-WOI-OP-41.0, R.1
54.	TA-16-0413	WFO	ADWP	Component Storage	Depleted Uranium	ESA-WOI-OP-41.0, R.1
55.	TA-16-0414	WFO	ADWP	Storage Building	Depleted Uranium	ESA-WOI-OP-41.0, R.1
56.	TA-16-0415	WFO	ADWP	Component Storage	DU	ESA-WOI-OP-41.0, R.1
57.	TA-16-0955	WFO	ADWP			
58.	TA-18 ALL	IFCS		60 facilities		
59.	TA-21-0005	IFCS		Laboratory Bldg	Radiological contamination	
60.	TA-21-0089	IFCS				
61.	TA-21-0150	IFCS		Molecular chemistry	Radiological contamination	
62.	TA-21-0152	IFCS		Laboratory	Legacy Contamination	ESA-WOI-OP-41.0, R.1
63.	TA-21-0155	IFCS		TSTA Facility	Radioactive-mixed contamination	
64.	TA-21-0209	IFCS		Labs. & Offices, TSFF	Tritium, DU, Pu	ESA-WOI-FSP-TSFR, Rev 0
65.	TA-21-0213	IFCS		Lab Supply Warehouse	Radiological contamination	
66.	TA-21-0257	EWMO		RLWT	Treatment of radioactive liquid waste, Analysis of volume measurement	Development stage
67.	TA-21 MDA B NES	EWMO		MDA B NES	An inactive Material Disposal Area consisting of four major pits, a small trench, and miscellaneous small disposal sites.	
68.	TA-35-0002	STO	ADTR	Nuclear Safeguards Research Bld.	Sealed Sources, various other	TRPFOD-OPS-SORD-011.0
69.	TA-35-0027	STO	ADTR	Nuclear Safeguards Lab.	Sealed Sources, various other	TRPFOD-OPS-SORD-011.0

	TA-Bldg	FOD	RAD	Facility	Description	Haz Cat Document
70.	TA-35-0034	STO	ADTR	Nuclear Safeguards Research Bld.	Sealed Sources, various other	TRPFOD-OPS-SORD-011.0
71.	TA-35-0087	STO	ADTR		Sealed Sources, various other	TRPFOD-OPS-SORD-011.0
72.	TA-35-0124	STO	ADEPS	Antares Target Hall	Pu-239	MST-AB-FOM-ALL-04-0002, rev.0
73.	TA-35-0125	STO	ADEPS	Atlas Bldg	NHMFL, Pu-239, Am-241	MST-AB-FOM-ALL-04-0002, rev.0
74.	TA-35-0126	STO	ADEPS	Mechanical Bldg	Pu-239, Np-237	MST-AB-FOM-ALL-04-0002, rev.0
75.	TA-35-0189	STO		Trident Laser Lab	Used Pu-239 sealed source	TRPFOD-OPS-SORD-011.0
76.	TA-35-0213	STO	ADEPS	Target Fabrication Facility	Various	MST-AB-FOM-ALL-04-0002, rev.0
77.	TA-35-0374	STO	ADTR		Contaminated Hoods	TRPFOD-OPS-SORD-011.0
78.	TA-36-0001	IFCS		Lab and Offices	Radiological contamination	
79.	TA-36-0214	IFCS		Central HP Calibration Facility	Calibrate Rad Prot. Inst.	ESH4-RIC-SOP-06,RI
80.	TA-37-0010	WFO	ADWP	Storage Magazine	Depleted Uranium	ESA-WOI-OP-41.0, R.1
81.	TA-37-0016	WFO		Storage Magazine	Depleted Uranium, Fixed Cont.	ESA-WOI-OP-41.0, R.1
82.	TA-39-0002	STO	ADTR	Lab/Office Building	Contamination	MST-AB-FOM-ALL-04-0002, rev.0
83.	TA-41-0001	STO	ADTR	Underground Vault	Depleted Uranium	TRPFOD-OPS-SORD-011.0
84.	TA-41-0006	STO	ADTR	Laboratory	Tritium contamination	TRPFOD-OPS-SORD-011.0
85.	TA-43-0001	STO	ADTR	Health Research Lab	Various	TRPFOD-OPS-SORD-011.0
86.	TA-43-0028	STO	ADTR		Various	TRPFOD-OPS-SORD-011.0
87.	TA-43-0047	STO	ADTR		Various	TRPFOD-OPS-SORD-011.0
88.	TA-43-0049	STO	ADTR		Various	TRPFOD-OPS-SORD-011.0
89.	TA-43-0061	STO	ADTR		Various	TRPFOD-OPS-SORD-011.0
90.	TA-46-0001	STO	ADCLES	Laboratory/Office	Various	MST-AB-FOM-ALL-04-0002, rev.0

	TA-Bldg	FOD	RAD	Facility	Description	Haz Cat Document
91.	TA-46-0024	STO	ADCLES	Laboratory/Office	Various	MST-AB-FOM-ALL-04-0002, rev.0
92.	TA-46-0025	STO	ADCLES	Engineering Lab	Various	MST-AB-FOM-ALL-04-0002, rev.0
93.	TA-46-0030	STO	ADCLES	Electronics Lab	Various	MST-AB-FOM-ALL-04-0002, rev.0
94.	TA-46-0031	STO	ADCLES	Test Building #2	Various	MST-AB-FOM-ALL-04-0002, rev.0
95.	TA-46-0041	STO	ADCLES	Laser Isotope Support Facility	Various	MST-AB-FOM-ALL-04-0002, rev.0
96.	TA-46-0154	STO	ADCLES	Physical Chemistry Lab	Various	MST-AB-FOM-ALL-04-0002, rev.0
97.	TA-46-0158	STO	ADCLES	Laser Induced Chemistry Lab	Various	MST-AB-FOM-ALL-04-0002, rev.0
98.	TA-46-0208	STO	ADCLES	FEL Lab Building	Various	MST-AB-FOM-ALL-04-0002, rev.0
99.	TA-46-0416	STO	ADCLES	Morgan Shed	Various	MST-AB-FOM-ALL-04-0002, rev.0
100.	TA-48-0001	STO	ADCLES	RC-1	Radiochemistry	PRO-C-DO-007.5
101.	TA-48-0008	STO	ADCLES	Isotope Separator BLDG	Various	PRO-C-DO-007.5
102.	TA-48-0017	STO	ADCLES	Assembly & Checkout BLDG	Various	PRO-C-DO-007.5
103.	TA-48-0026	STO	ADCLES	Office BLDG	Various	PRO-C-DO-007.5
104.	TA-48-0027	STO	ADCLES	Transportable	Various	PRO-C-DO-007.5
105.	TA-48-0028	STO	ADCLES	Adv Analytical Devel BLDG	Various	
106.	TA-48-0033	STO	ADCLES	Transportable	Various	PRO-C-DO-007.5
107.	TA-48-0038	STO	ADCLES	Metal BLDG	Various	PRO-C-DO-007.5
108.	TA-48-0039	STO	ADCLES	Metal BLDG	Various	PRO-C-DO-007.5
109.	TA-48-0045	STO	ADCLES	Clean Chemistry/Mass Spec	Various	
110.	TA-48-0063	STO	ADCLES	Transportainer	Various	

	TA-Bldg	FOD	RAD	Facility	Description	Haz Cat Document
111.	TA-48-0107	STO	ADCLES	Weapons Analytical Chemistry	Various	
112.	TA-48-0111	STO	ADCLES	Transportainer	Various	PRO-C-DO-007.5
113.	TA-48-0168	STO	ADCLES	Chem-Stor BLDG	Various	PRO-C-DO-007.5
114.	TA-48-0180	STO	ADCLES	Chem-Stor BLDG	Various	PRO-C-DO-007.5
115.	TA-48-0181	STO	ADCLES	Chem-Stor BLDG	Various	
116.	TA-48-0215	STO	ADCLES	Transportainer	Various	PRO-C-DO-007.5
117.	TA-48-0236	STO	ADCLES	Walk-in Cooler	Various	PRO-C-DO-007.5
118.	TA-50-0037	EMWO		Arctic	No SNM except for holdup in ventilation system duct work, Pu-239	None
119.	TA-53-0945	LANSCE		Liq. Waste Treatment Facility	Rad Liq. Treatment Facility	SOP-RLW-002.R.3
120.	TA-53-0954	LANSCE		Rad Liq. Waste basins	Evaporation Basins	SOP-RLW-002.R.3
121.	TA-54, Area L	EWMO		Liquid hazardous waste treatment & storage	Liquid hazardous waste treatment & storage	AP-SWO-002, Data Management of CWDRs and WPFs
122.	TA-54-0412	EWMO		DVRS	Decontamination & volume reduction system	Development stage
123.	TA-54-1009	EMWO		Decontamination Facility	Decontamination Facility	PS-Policy-001, project support acceptance criteria
124.	TA-59-0001	IFCS		Occupational Health Lab	Analytical-Environmental	FSP-C-OPS-71-03.2

Appendix E: DOE 2010 Pollution Prevention Awards for LANL

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DOE Headquarters, in conjunction with the NNSA, sponsor annual pollution prevention awards programs. The programs provide recognition to personnel who implement pollution prevention projects. LANS submits nominations for the DOE/NNSA awards each year and received four awards for pollution prevention projects during FY09, including two Best-in-Class awards. The winning projects are described below.

- ***RCRA-less Oxidation*** - Historically, most actinide oxidation chemistry has been performed using RCRA-listed silver and thallium salts. In the past year, it was demonstrated that simple copper (I)-salts can provide easy chemical control over uranium in oxidation states ranging from U(III) through to U(VI). The large range of accessible oxidation states using a single non-toxic reagent is unprecedented and has substantial implications for actinide separations schemes and longer-term impact for advanced nuclear fuel cycles. The estimated reduction in Mixed Low Level Rad Waste generation is significant and has reduced the labor-hours and monies spent in the management of this waste stream. The new copper-based oxidation protocol also represents the third "R" in Recycling, Reuse, and Reduce and provides cost savings. This approach, RCRA-less Oxidation, represents a 140-fold decrease in cost for waste treatment and disposal relative to other, standard oxidation methods used in this chemistry. Further, it entirely eliminates a Mixed Low Level Radioactive Waste stream and instead produces Low Level Rad Waste. As mentioned above, there is also a 3-fold decrease in cost of raw starting materials as silver salts are more expensive than the corresponding copper variants.

- ***RLUOB Integrated Planning, Design, Procurement, and Construction*** - In 2004, the decision was made to use the LEED® third party rating system to document the high performance sustainable design considerations and measure the level of sustainability achieved by the building. This decision was made four years prior to establishment of Department of Energy (DOE) Order 430.2B LEED requirements. In 2005, RLUOB was registered under the LEED for New Construction (LEED-NC) Version 2.1 rating system. Green design and implementation elements include:
    - In 2005, the design/build subcontract was awarded with a specific requirement to achieve LEED Silver Certification.
    - Sustainable Site Selection and Development – The RLUOB was sited at a pre-developed location adjacent to programmatic facilities it will serve in an area that meets LEED sustainable site requirements. The site has been designed to minimize site development area and restore open space with native vegetation.

- Over 93% of the RLUOB roof is constructed with highly reflective roofing material that minimizes the heat island affect to adjacent facilities and land. (LEED-NC requires a minimum of 75% roof area for two credits.)
- Water Efficiency - Low-flow faucets, shower-heads and toilets installed in non-radiological areas will result in over a 30% reduction in water use over the life of the building. Further, planting of native/adapted species without permanent irrigation will result in a significant reduction in potable water use.
- Optimized Energy Performance – The energy model developed for the RLUOB shows an approximate 16% reduction (by cost) from a baseline building established in accordance with ASHRAE 90.1-1999, Energy Standard for Buildings Except Low-Rise Residential Buildings.
- Reduced environmental impact of materials and resources – Construction waste diversion and the use of products with recycled material content, as well as other strategies such as requiring local/regional materials, and Forest Stewardship Council certified wood products all contribute to reduced environmental impact.
- Through September 2009, approximately 85% (by weight) of RLUOB construction waste including concrete, metal, corrugated cardboard, wood, and asphalt were recycled or reused and thereby diverted from disposal in landfills.
- Recycled Material Content –Materials that contribute to the RLUOB recycle content goal of 10% include: concrete – poured in place and pre-cast panels; steel beams, wall panels, plates, wire, and rebar; metal wall framing and studs; sheetrock; ceiling panels; fireproofing; insulation; and glazing.
- Enhanced Indoor Environmental Quality – A construction indoor air quality management plan was developed and implemented that included protecting heating, ventilation, and air conditioning equipment and duct by covering with plastic while in storage and after installation until the building is complete. Specification and installation of low-emitting materials such paints, carpets, flooring, adhesives and sealants was performed to reduce occupant exposure.
- Lessons learned during RLUOB design and construction activities are already being applied to other LANL projects including the future Nuclear Facility. CMRR Project staff participate in monthly meetings with LANL staff from other programs and projects (e.g., Institutional Site Planning and Design Engineering) to share success stories and evaluate opportunities to improve LANL processes,

such as modifications to LANL master performance specifications to ensure LEED documentation requirements are addressed.

- ***<u>LANL's Electronic Recycling Program</u>*** - In the past, LANL removed the computer hard-drives, shredded and disposed of them through an out-of-state electronic recycler in Santa Cruz, California. The computer shell was then was released for sale to the public. LANL property management staff recognized they could not guarantee that the materials sold to the public would be managed appropriately, especially in light of rising concerns about electronics recycling in third world countries and associated pollution and public health issues. In addition, new memory device security requirements greatly expanded the universe of electronic memory devices to include digital cameras, two-way radios, cell phones, and pagers, copiers, faxes, printers, PDAs, iPods, phones, thumb drives, as well as circuit boards, computers, and laptops, increasing potential waste disposal. Property management staff identified improvements to the process that improved security and closed the loop on all of LANL's salvaged memory devices, ensured proper cradle-to-grave management of LANL property through a zero-waste system, and reduced the operation's overall carbon footprint! In 2009, LANL shipped 93,554 lbs of E-waste to Terrell, TX and process fees including internal transportation costs were ~$14,000 or $0.15 cents per pound down 37% from the original shipment. The estimated savings is for one year is $172K and all of LANL's e-waste is recycled and not disposed of in a local landfill or shipped overseas.

- ***<u>Alternative Fuel Use at LANL</u>* -** In FY 2008, the LANL Fleet Team championed a Performance Incentive Project to determine how the LANL vehicle Fleet could be downsized and right-sized. The Fleet Team began implementing the proposals and by FY 2009, a third of the fleet was E-85 capable. In FY 2010, one-half of the Laboratory's fleet of vehicles are Flex-Fuel. Currently, 75 percent of the SOC fleet in Los Alamos is powered by E-85. DOE Order 430.2B requires alternative fuel to be available within a five-mile radius of any DOE site, since no local vendors have E-85 fuel available, to comply with the order and to continue allowing security patrols to meet Laboratory security requirements, Fleet Management procured a mobile E-85 fuel transport truck. The drivers of SOC flex-fuel vehicles requiring fuel are contacted by radio and asked to converge at a specified fueling location. By using alternative fuels, LANL is meeting the intent of Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management, which led to DOE Order 430.2B. In addition, using E-85 sends a message to surrounding communities and residents that the Laboratory is taking environmental stewardship seriously.

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To obtain a copy of the SWEIS Yearbook – 2010, contact
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The 2010 Yearbook is available on the web through the
Los Alamos National Laboratory Public Reading Room:
http://eprr.lanl.gov

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Los Alamos

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